THE MARINE REVIEW

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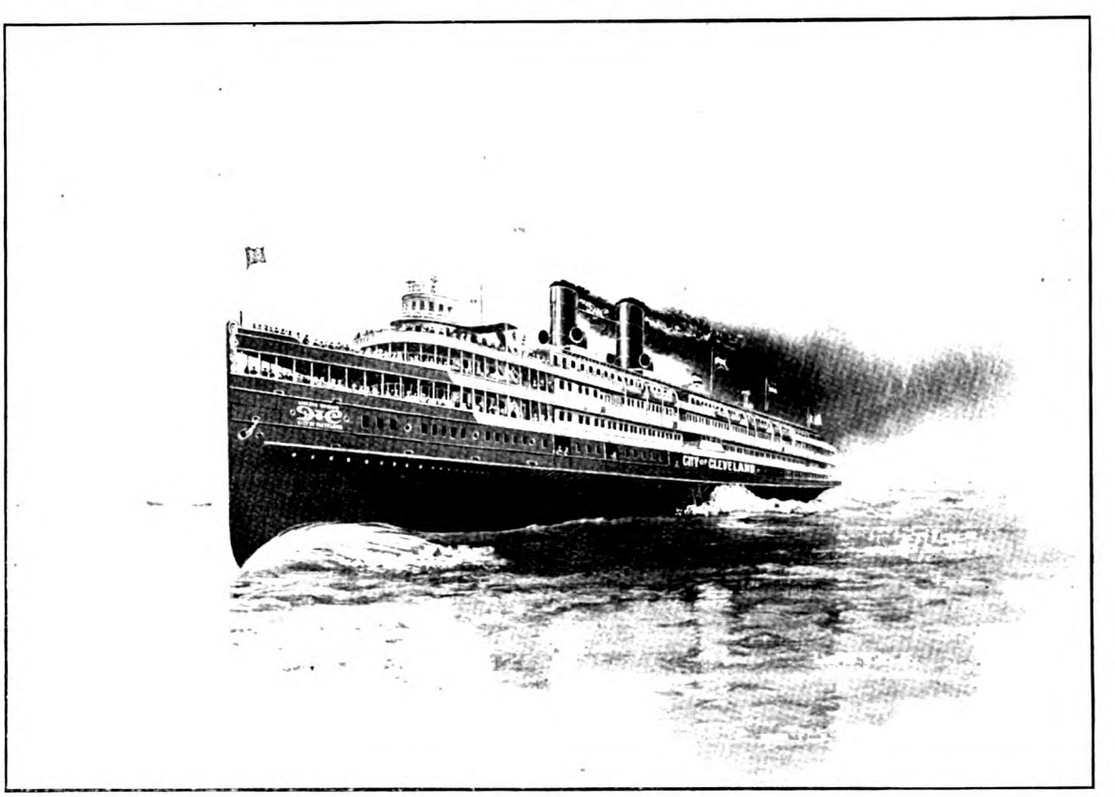
NEW STEAMER CITY OF CLEVELAND

The trial trip of the new steamer City of Cleveland on Monday, April 27, was satisfactory in every way and was all that her designer, Frank E. Kirby, her owners, the Detroit & Cleveland Steamboat Co., and her builders, the Detroit Ship Building Co., could desire. It was practically impossible to give her a dock trial, owing to her great size, ample seaway and deep water being absolutely necessary. Had a dock trial been attempted she would probably have torn the piling from the dock. She made the run from Southeast Shoal to Long Point, a distance of 133¼ miles, in 6 hrs. and 40 min., an average of 20 miles an hour, being 2 min. ahead of the regular schedule. She was due at Long Point at 7:45 and crossed the line at 7:43 P. M. It was the intention to try her out on the return trip at varying trim and speeds, but her performance was so satisfactory that the owners declared themselves to be satisfied. The return trip was therefore made in quite leisurely fashion, reaching Detroit about noon on Tuesday.

After passing Southeast Shoal her boiler pressure was gradually increased from 135 to 160 lbs., thus demonstrating her ample steam capacity, her revolutions meanwhile increasing from 27 to 30, the maximum horsepower being 6,600. Her trim was altered once during the run to get her down a bit by the head, but she was not checked down at any time for any purpose; nor was there so much as a hot bearing during the



NEW STEAMER CITY OF CLEVELAND.

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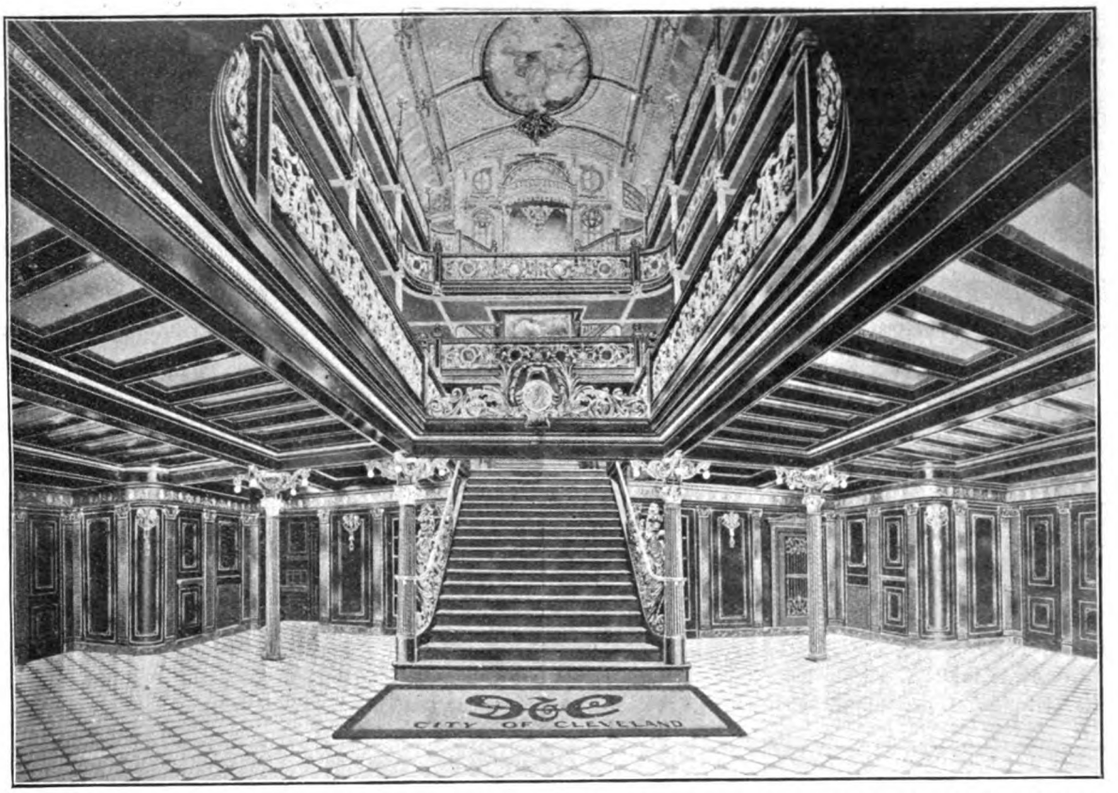

PASSENGERS' ENTRANCE NEW STEAMER CITY OF CLEVELAND, SHOWING THE TIER OF DECKS AND MURAL DECORATIONS.

run. Her admiralty coefficient is remarkably high. She is a better model than any side wheeler on the lakes and will do more on equivalent power.

The maximum speed developed during the run is indeterminate as there was no means of definitely measuring it, but it was probably a little better than 21 miles. No opportunity had been afforded to properly set the Nicholson log and its diagram was therefore misleading. It indicated 18 miles except for a brief period where it indicated a little over 19. As there were no landmarks whereby to check its performance, this was very discouraging for a time, but eventually the car ferry collier Marquette & Bessemer No. 2 was picked up on her course across Lake Erie. The time was taken as the Cleveland crossed her bows, having then run 90 miles from Southeast Shoal, and it was found that she was making 20 miles an hour. As stated, she concluded the trip at 7:43, an average of 20 miles. Allowing an error of two miles to the log, which is reasonable under the circumstances, the maximum speed of the new steamer was a little better than 21 miles.

The behavior of the steamer was in every way eminently satisfactory. Though it blew half a gale during the entire trip she was very steady. In this respect she behaves better than any boat on the lakes. Her steering qualities are admirable, and there is a practical absence of vibration. Her bow rudder was thoroughly tested enabling her to maneuver beautifully in restricted waterways. After passing Colchester Reef on the return trip her regular gear was put out of commission and the Akers emergency steam steerer thrown in. This change was effected in 12 seconds, the steamer completing the balance of her trip with this emergency gear.

Among those aboard were: Mayor W. B. Thompson, of Detroit; Robert Logan, Frank E. Kirby, Robert Wallace Sr., R. B. Wallace, J. L. Wallace, M. E. Farr, Frank Jeffrey, A. P. Rankin, Frank LaMarche, O. N. Steele, P. H. McMillan, A. A. Schantz, Walter Campbell, C. F. Bielman, L. C. Waldo, Edward Hill, Henry Penton, W. E. Taylor, Prof. H. C. Sadler, Louis Keil, E. L. Nicholson, J. B. Ford, E. L. Ford, C. H. Westcott, J. W. Westcott, H. E. Boynton, F. B. Smith, James Schermerhorn, George W. Moore and E. C. Akers. Capt. Alexander J. McKay commanded the steamer, Capt. Frank C. Stewart was pilot, and J. B. Wells was in general charge of machinery.

There is this much to be said about the new steamer—that she is as pronounced an advance over the ordinary lake passenger boat as the Lusitania and Mauretania are over the ordinary Atlantic liner. She is going to be a revelation to the lake trade. Robert Logan says that in any service at all comparative she has not her equal in the world. There is nothing on the Clyde or in English waters that approach her. She has so many comforts and conveniences aboard her that are not to be found on other lake steamers that it will not be surprising if the D. & C. Co. would have to build a duplicate in order to satisfy the demand of the public. One no sooner steps aboard than he is conscious of the wide departure which she makes from the prevailing type of steamer. In the ordinary steamer the view from the passengers' entrance is restricted to the main deck exclusively, but the view obtained from the lobby of the City of Cleveland embraces the cabin, promenade and gallery decks, giving one the impression of a grand theater with its tier of boxes. One side of the passengers' entrance is taken up with the purser's and steward's offices and the other side with the passenger elevator leading from the main deck to the gallery decks, and the telephone booths with local and long distance connections over 10 trunk lines. There is a telephone in each stateroom and what the ordinary traveler will most appreciate—running water in every

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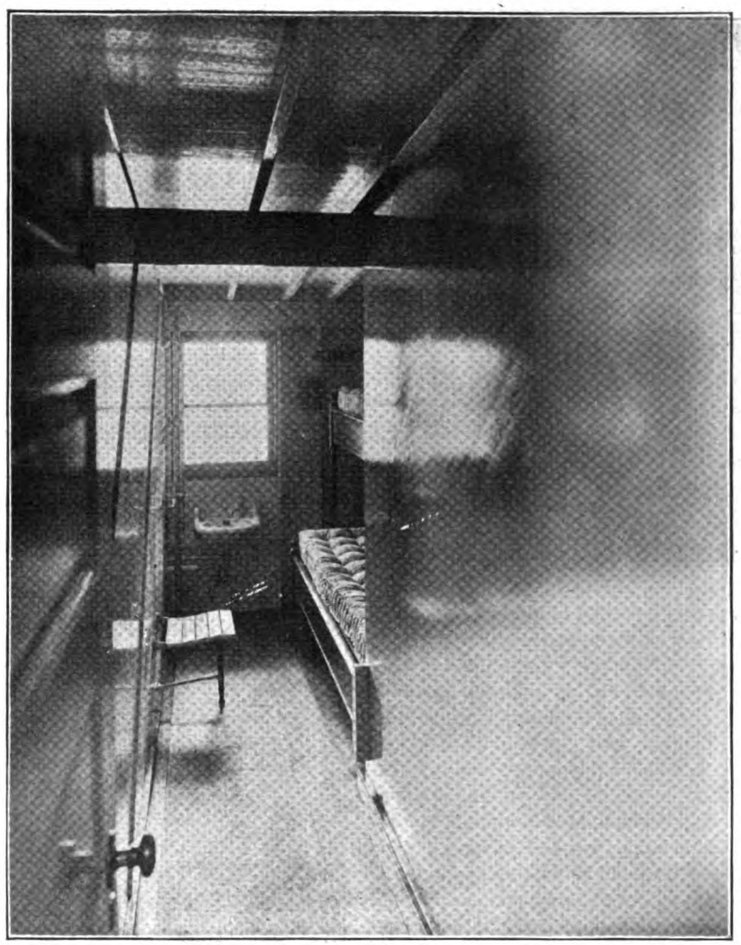


TYPE OF STATEROOM WITH CORRIDOR ON THE CITY OF CLEVELAND.

room. Moreover, 22 of the staterooms have parlor and bath adjoining, and six of the staterooms have a private balcony as well.

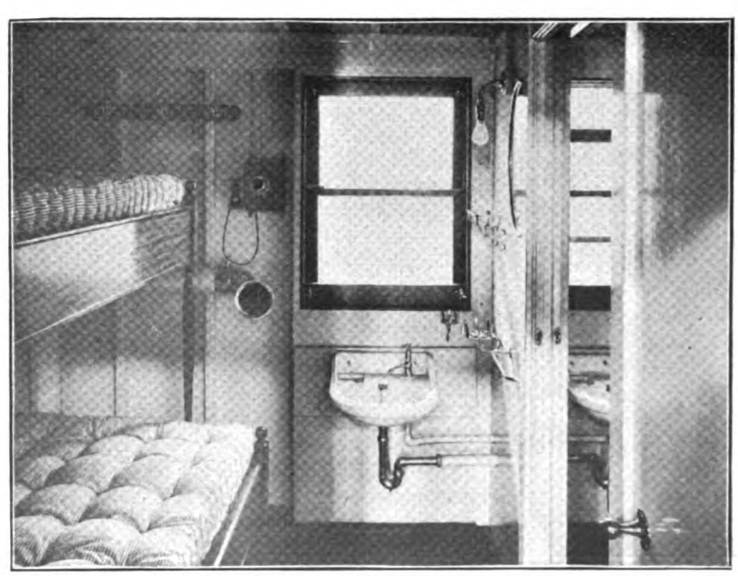
In addition to the general dining room there are two private dining rooms forming wings to the general dining room. Aft of the dining room is the buffet, which is an innovation on the D. & C. boats.

The most attractive feature of the steamer is what the company calls a convention room on the gallery deck. It is really a lounge or observation room extending the full width of the ship, fitted with easy chairs and exquisitely decorated with mural paintings, the work of Wm. d'Leftwich Dodge, 51 West Tenth street, New York. The mural paintings throughout the entire ship are the handiwork of Mr. Dodge and are exceedingly well done, comparing favorably with the mural paintings in the library of congress. The smoking room as well as 16 of the parlors were upholstered by A. A. Gray & Co., designers and upholsterers, of Detroit, Mich.

The new City of Cleveland is a big steamer, her launching weight equaling that of the Western States and Eastern States combined. She is 402 ft. over all, 390 ft. keel, 54 ft. beam, 91 ft. 6 in. over guards, and 22 ft. deep. Her hull is constructed of mild steel divided into 10 compartments by watertight cross bulkheads extending from keel to main deck. A double bottom is fitted extending nearly the entire length divided into 10 compartments which provides for the safety of the ship in the event of grounding and can be used to vary the trim and draught by means of water ballast. Powerful pumps are fitted for this purpose. A steadying tank of 100 tons capacity is provided amidships to check rolling in a heavy sea.

Her bottom frames are 5 in. by 3 in. by 10-lb. angles; side frames 6 in. by 3½ in. by 15-lb. channel, and inner bottom 3 in. by 7.2-lb. angles, all spaced 30-in. centers. The intermediate frames are 5 in. by 3 in. by 10 lbs. The double inner bottom frames are 3½ in. by 10 lbs. where required for machinery.

The steamer has seven decks, the main deck of steel being sheathed with wood to deaden the noise of handling cargo. For protection against fire in addition to the usual equipment required by the United States steamboat laws, a complete sprinkler system is installed leading to the freight deck, main saloon and wing passages, together with a thermostat automatic alarm system in every room, which will give alarm in event of fire breaking out. The ship is ventilated throughout with cool fresh air by the McCreery system, two separate plants being installed. This system is carried out elaborately and air, washed and cooled, is conveyed directly into every stateroom. A vacuum cleaning system is provided for removing dust and dirt from the carpets and furniture. A complete Fuller electric plant provides 1,500 lights



AN ORDINARY STATEROOM ON THE CITY OF CLEVELAND.

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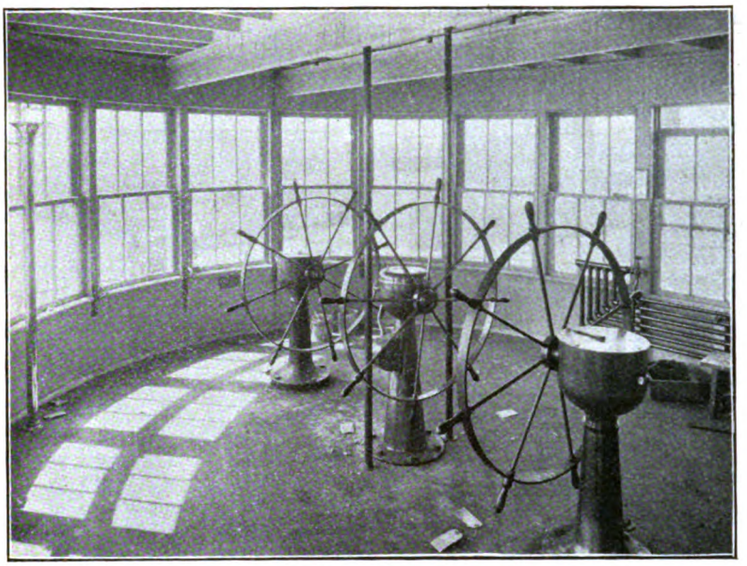
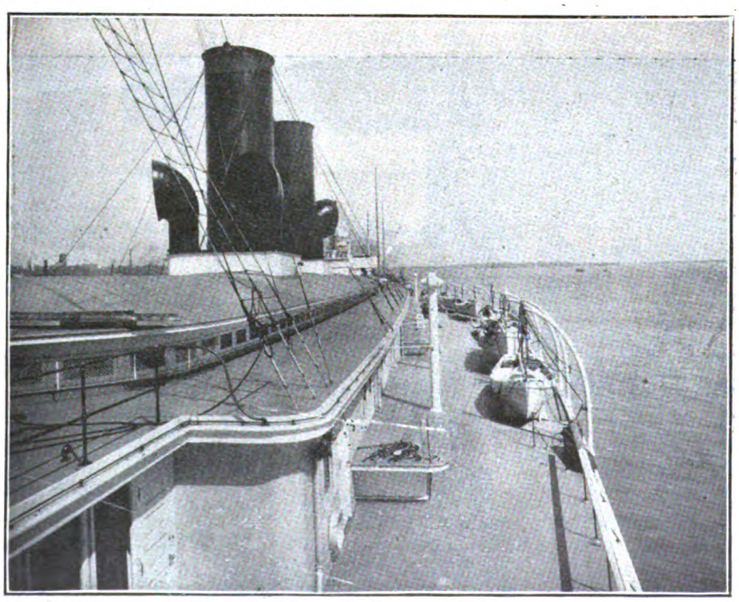


THE WHEEL HOUSE OF THE NEW STEAMER CITY OF CLEVELAND.

as well as a searchlight of 5,000 candle-power. There are over 17 miles of electric wiring aboard the ship.

The propelling machinery, which was designed by A. P. Rankin, chief engineer of the American Ship Building Co., consists of an inclined three-cylinder, compound engine, the high pressure being arranged between the two low pressure cylinders, the diameters of cylinders being 54 in. for the high pressure and 82 in. for the two low pressure cylinders, with stroke of pistons of 8 ft. driving feathering paddle wheel 29 ft. in diameter, the paddles being 14 ft. long and about 4 ft. wide. Poppet valves are fitted on the high pressure cylinder and Corliss valve gear on the two low pressure cylinders. This type of engine was designed because it was necessary that a type should be selected which would work with equal efficiency at high and low powers. This steamer is intended to make two trips a day, the day trip, in which time will be at a premium, to be at high speed, and the night trip conforming to the present schedule. It was also desirable that one-third of the total power should be developed in each cylinder instead, as is usual in three-cylinder, compound engines, the high pressure cylinder developing almost one-half and the two lows not much over 25 per cent each. This is what led to the adoption of the peculiar combination of valve gear, which is probably the first of its kind attempted in marine work. The result of this arrangement is that each cylinder has a very wide range of expansion, the cut-off point in each cylinder being adjustable from the starting platform at from one-fourth to five-eighths of the stroke. The pressure in the low pressure receivers can thus be adjusted to divide the total power into thirds. Each low pressure engine drives a vertical air pump 50 in. in diameter by 40-in. stroke, the efficiency of which is demonstrated by the steady vacuum of 24 in., which was maintained all through the trial run. The shafting and other large forgings on the engine are all forged of open-hearth carbon steel, oil tempered and annealed, the main shafting being hollow. The crank shaft is 75 ft. from end to end and is 22 in. in diameter at the bearings. Some idea of the size of the engine may be gathered from the fact that the bare castings for the low pressure cylinders weigh in the neighborhood of 24 tons each. The solidity of the foundation of the engine was a noticeable feature during the run. At full power there was no movement apparent.



VIEW ON THE BOAT DECK OF THE CITY OF CLEVELAND.

LOOKING DOWN AT THE WHEEL.

The stokehold was at all times comfortably cool, special pains having been made to ventilate it.

Eight cylindrical boilers are provided located in two separate watertight compartments, 13 ft. 9 in. diameter and 12 ft. long, each provided with two furnaces 52 in. diameter, fitted with Howden hot draft and allowed a working pressure of 160 lbs. per sq. in. The steamer has two funnels. The auxiliary machinery consists of compound feed pump, fire pump, sanitary pump and fresh water ballast pump, all of the Blake type; double steam steering engine, two gypsy capstans, one deck capstan, combined steam windlass and capstan, all of the Globe type. As stated, the Akers emergency steam steering gear is also installed, as well as the Nicholson ship log.

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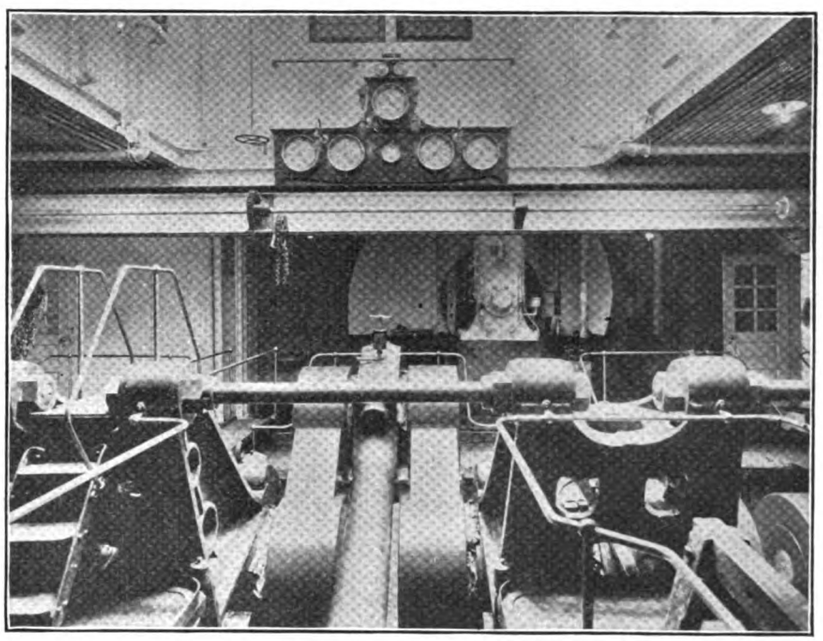
ATLANTIC COAST GOSSIP

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

The total number of arrivals of vessels of all classes at the port of New York during the month of April was 815. The total number of arrivals from foreign ports was 368, and from domestic 427.



VIEW OF THE ENGINE ROOM, CITY OF CLEVELAND.

The senate on April 28 passed the Frye bill providing for the regulation of seagoing barges.

The British steamship St. Bride, which picked up and towed into Halifax the disabled German steamer Deike Rickmers, arrived at New York on April 28.

The bureau of yards and docks contemplates an expenditure of $256,000 in the next fiscal year for the provision of public works at the Brooklyn navy yard. The improvements will consist of electric plant extension, central power plant, underground conduits, railroad equipment, reconstruction and the extension of the railroad and telephone systems.

A company has been formed under the laws of New Jersey with the intention of running excursion steamers between Atlantic City, Beach Haven, and Tuckerton this coming summer, with the expectation of running them as far as Bay Head when the new inland waterway is completed.

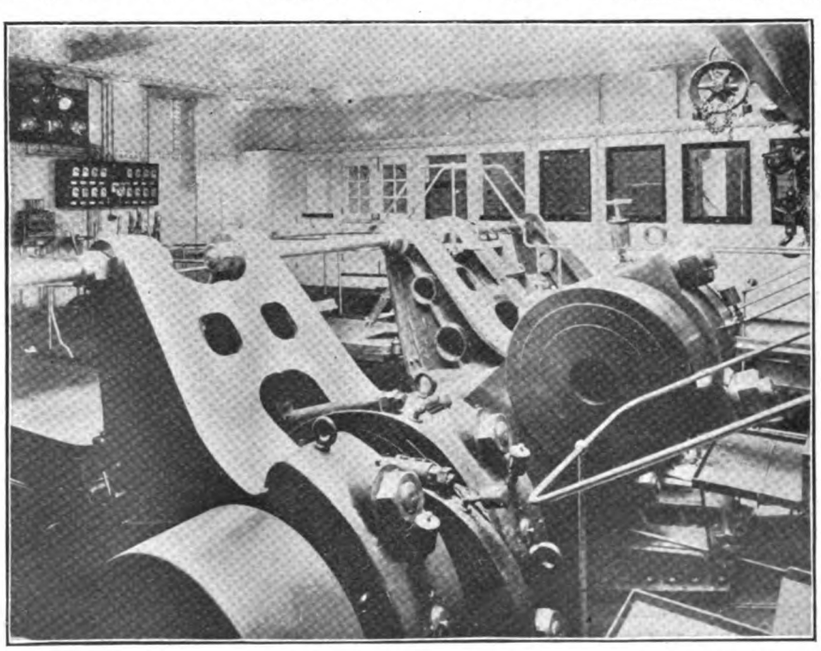
The board of directors of the Philadelphia Maritime Exchange during the past week elected the following officers for this year: President, J. S. W. Holton; vice president, P. F. Young; treasurer, Joseph A. Ball; secretary, E. R. Sharwood; assistant secretary, James T. Kernan; solicitor, John F. Lewis.

The submarine boats Viper, Tarantula, and Cuttlefish are expected to arrive at New York in the course of a few days from the Chesapeake under their own power, where they will be joined by the record holder Octopus. It is expected that the flotilla of submarines will visit Kingston, N. Y., early in June to take part in the festivities arranged there for that week.

While bound for Baltimore and Galveston the North German Lloyd steamer Koln, which left Bremen on April 30, collided in a dense fog with the tank steamer Emperor Nicholas II, nine miles off Norderney. The German steamer Feldmarschall took off the Koln's 850 passengers and towed the injured vessel into Bremerhaven. Both vessels in the colision were seriously damaged.

A committee of the American Association of Masters, Mates, and Pilots on April 30 presented a monster petition to the president and attorney general requesting that a pardon be granted to Captain William Van Schaick, of the ill-fated Slocum, now serving a 10-year sentence. The president assured the committee that the matter would receive a careful consideration. There were close to 246,000 signatures on the petition.

The big tank steamer Pectan left Philadelphia on Saturday for London with 3,500,000 gallons of gas oil in bulk, this being one of the largest cargoes of the kind that has ever left



SHOWING THE MASSIVE CHARACTER OF THE MACHINERY OF THE CITY OF CLEVELAND.

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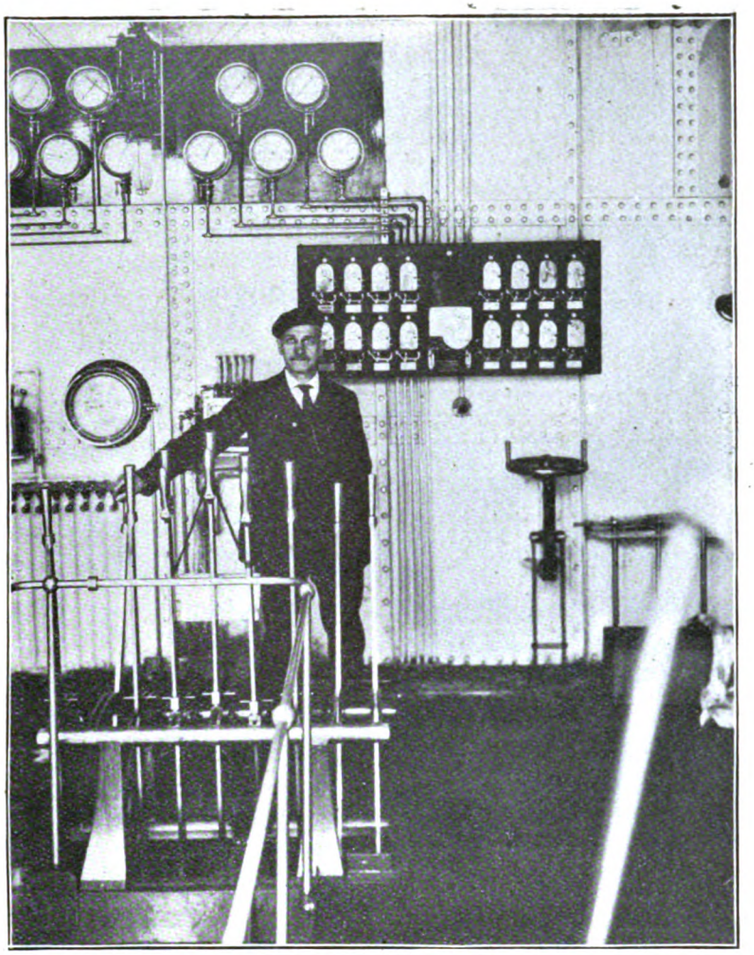


MR. J. B. WELLS ON THP STARTING PLATFORM OF THE CITY OF CLEVELAND.

an American port. She passed down the Delaware drawing 28 ft. of water.

The turbine steamers Yale and Harvard will go into service on the all-water route to Boston for the season on Monday, May 11.

Colonel Thompson, who chartered the British steamer Mineola for a trip around the world, and is now in Japan, will shortly sail for Seattle, where he will leave the Mineola and return to New York.

The German steamship Burgermeister Petersen, which was towed into Halifax minus three of her propeller blades by the British steamer Columbian, on April 20, arrived at Philadelphia on Sunday.

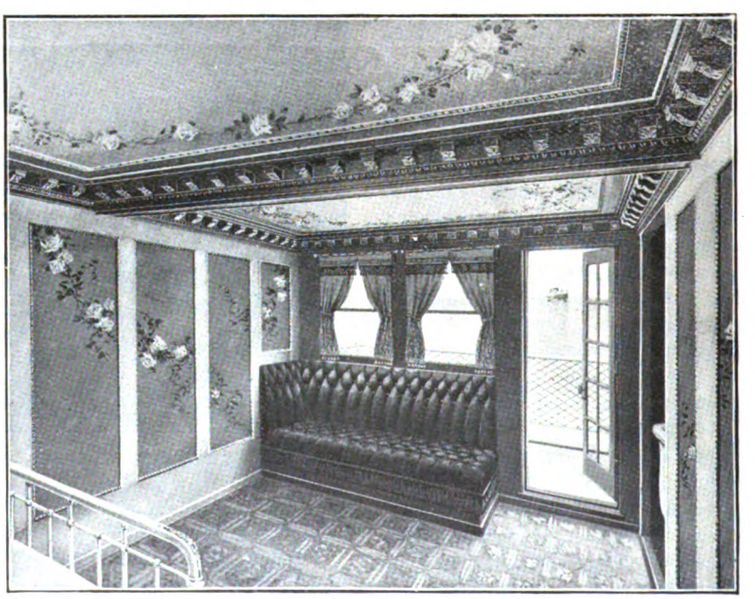
The Hudson & Passaic Canal Co. was incorporated at Trenton, N. J., on May 1, with an authorized capital of $90,000 to construct a canal connecting the Hudson and Passaic rivers. The canal will run from Wallington, Bergen county, N. J., to Edgewater, a distance of nine miles. The directors of the company are L. W. Serrell, of Plainfield; G. E. P. Howard, of South Orange; Robert A. Montgomery, of Lambertville; and John J. O'Leary, Charles H. Bickell, Kilbert D. Bogert, and Bird W. Spencer, of Passaic.

The new schoolship Newport, on board of which are 98 cadets, has sailed from New York on the nautical school's annual cruise to the Mediterranean and other European parts. The Newport, which has replaced the old schoolship St. Mary's, was formerly a United States gunboat. She is in command of Capt. L. H. Everhart, U. S. N., retired, who was recently elected superintendent of the nautical school. The Newport expects to reach Madeira on July 28, leaving there for New York on Aug. 11.

The British steamer Lackawanna has arrived at New York from Shields and reports having passed through a large ice floe last Wednesday about 200 miles off Cape Race. Capt. Gray estimated that there were in all about 30 bergs, traveling southward.

The big four-masted German ship Peter Rickmers, of the Standard Oil Co.'s fleet in the far east, went on the shoals 10 miles west of Fire Island Thursday night in a stiff gale. She sailed from New York Thursday morning with 3,000 tons of case oil for Rangoon, India.

The British steamship Norwood, from Glasgow for Sydney, Cape Breton, before reported lost, was abandoned on the Grand Banks as unfit, through being crushed in the ice, for further navigation. The crew was picked up by a passing schooner. The Norwood, which was built at West Hartlepool in 1888, was owned by the Doughty Shipping Co., of that city, and sailed from Glasgow on April 15 with a cargo of fire brick, ingot molds



PARLOR STATEROOM WITH BATH AND PRIVATE BALCONY.

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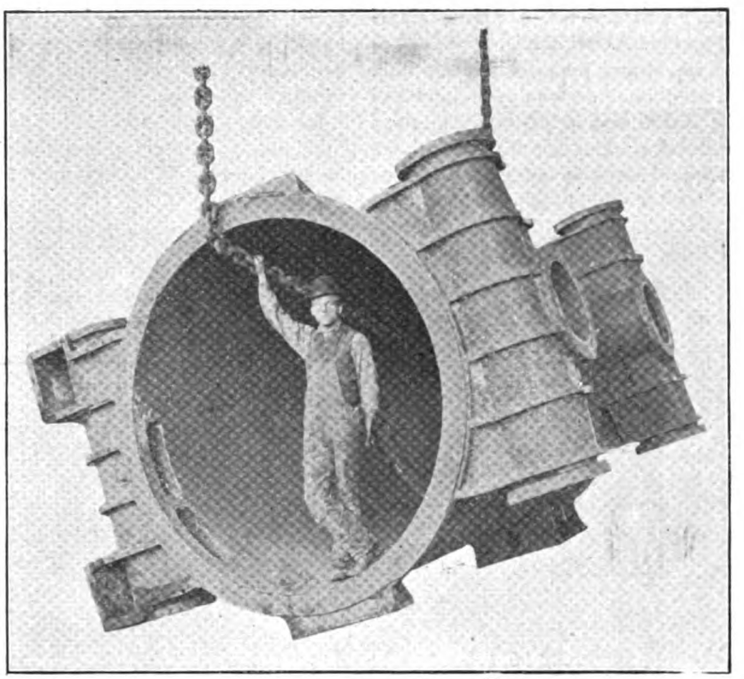
and machinery for the Dominion Iron & Steel Co.

The White Star liner Cretic, which arrived at New York on Monday, reported that on April 30 she passed the British steamer Justin, of the Booth Steamship Co., under sail with her propeller gone. The Cretic left the Justin, which desired a tow, in communication with another steamer, apparently of the same company.

Capt. Fay, of the German steamship Barcelona, which arrived at Philadelphia from Hamburg on Monday, reports that when within five miles of Nantucket lightship he could hear the submarine bell. Within three miles the strokes of the bell could be distinguished by having a man in the forepeak with his ear to the hull of the vessel.

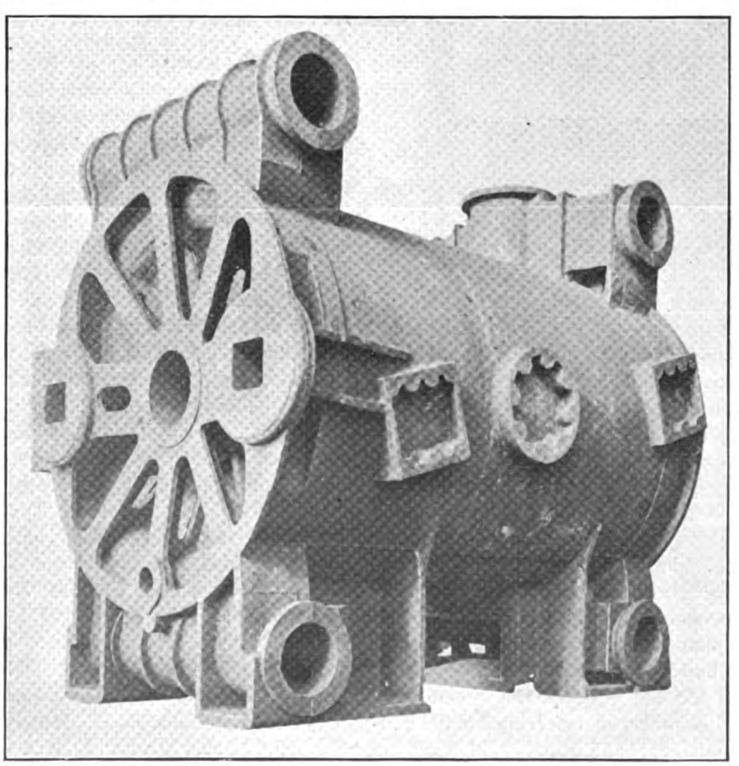
Lewis Nixon sailed on Saturday for Liverpool on the Cunard Line steamer Carmania, accompanied by Mrs. Nixon and son. They will remain abroad until the end of June.

To meet the recent cut in rates between the United States and Mediterranean ports made by the large continental lines, six Italian steamship lines have still further cut their steerage prices. The Navigazione Generale Italiano, Italia, Lloyd Italiano, La Veloce, Lloyd Sabaudo and Sicula Americana companies have reduced the steerage rates by $6 to Austrian-Hungarian ports, making a rate of $17 to Trieste and Fiume.



SHOWING COMPARATIVE SIZE OF LOW-PRESSURE CYLINDER.

The official survey of the American Line steamer St. Paul reveals that she sustained much greater damage in the collision with the British cruiser Gladiator than was at first thought. Her keel stem was completely carried away below the 26-ft. mark, and her plating injured for a distance of 20 ft. The necessary repairs will mean the withdrawal of this popular trans-Atlantic liner from the service for a time. The American Line subscribed $2,500 to the relief fund for the families of the men who lost their lives on the cruiser.



LOW-PRESSURE CYLINDER COMPLETED—WEIGHT 24 TONS.

The four-masted schooner Augustus H. Babcock arrived at Delaware breakwater last week for orders with 19,500 bags of sugar, the largest cargo ever brought from Porto Rico on a sailing vessel. She left Philadelphia last February for San Juan, carrying the largest cargo of coal ever received at that port.

Several large contracts for marine boilers have recently been closed by P. Delaney & Co., Newburgh, N. Y. The boilers will be installed at their marine repair and steam boiler works on the Hudson river.

There has been presented both in the senate report and before the house committee a long list of American steamships available for the carrying of supplies and materials to the canal zone. This is a service for which a large part of both the Atlantic and Pacific coast fleet is fairly well adapted. It is estimated that these American ships included in this list will suffice to carry two or three times over all the freight now being sent out to Panama.

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BULK FREIGHTER DONALDSON LAUNCHED.

The world and his wife saw the bulk freighter John A. Donaldson launched at the Lorain yard of the American Ship Building Co. on Saturday last, and those that had eyes to see saw also a model ship yard, spick and span and everything in place, resembling the well-ordered arrangement of a home with a good housekeeper in charge. The new steamer, which is building for W. H. Becker, of Cleveland, was christened by Mrs. Donaldson. All of Mr. Donaldson's friends saw the launching. The steamer was launched into the new dry dock. The company regretted its inability to empty the dock in order that the visitors might see it, as it is the largest dry dock on the lakes. The day, while a bit chilly, was clear, and everyone thoroughly enjoyed the occasion, which was really more of a social event than such functions ordinarily are. Everyone appeared to be bent upon testifying to the popularity of Mr. Donaldson.

Luncheon was served in the new mold loft to the entire assembly, numbering over 500 persons. Serving lunches is not the chief business of a ship yard and yet so well does the American Ship Building Co. plan everything ahead that not a moment's delay occurred. Everyone was immediately served and the service was perfect to the least detail.

MR. JOHN A. DONALDSON.

Russel C. Wetmore, vice president of the ship building company, in presenting Harvey D. Goulder as toastmaster said that what the guests had seen that day was no novelty to the ship building company, but that he hoped all had enjoyed the spectacle.

Mr. Goulder, in referring to the general business condition, said that he thought business on the lakes to be in sounder and better shape than almost any other trade in the country and that with the exercise of patience and good sense all would get out comfortably.

John S. Robb, father-in-law of Mr. Donaldson, made one of the best speeches that has ever been made at a launching on the lakes. It was easy, felicitous and amusing.

Speeches were made by George Arnold, Robert Wallace Sr., W. H. Becker, E. D. Carter of Erie, W. L. Hughes of Lorain, James Walsh of Pittsburg, and John A. Donaldson.

Mr. Donaldson expressed his delight that a certain element present had lost money on the launching. They had made a pool that nothing bearing the name of Donaldson could be made to take water. He paid a tribute to Mr. Becker in saying that he had the strength of a giant but never used it like one.

Quite a number of the members of the Singer's Club were present and the launching was brought to a close by the club singing "For He's a Jolly Good Fellow," under the leadership of Albert Rees Davis.

Those present at the launching were: Mr. and Mrs. W. H. Becker, Mr. and Mrs. John A. Donaldson, Mr. and Mrs. W. F. Higgins, Mrs. James C. Wallace, J. L. Wallace, Mrs. Margaret Donaldson, Harry C. Donaldson, Robert Wallace, Mr. and Mrs. James P. Walsh, Mr. and Mrs. Maurice Stone, Miss Zulika Becker, Miss Delta Harris, Miss Jane Donaldson, Capt. and Mrs. J. H. Bartow, J. M. Mulrooney, Mrs. Minnie C. Roberts, Capt. and Mrs. Charles L. Hutchinson, Mr. and Mrs. Henry Wineman of Detroit, Mrs. M. Andrews, Mr. and Mrs. Fred Saal, Miss Snavely, F. A. Arter, Roger Enwright of Boston, Mr. and Mrs. John S. Robb, Robert Mansfield, Capt. and Mrs. Arthur H. Hawgood, Capt. Alfred Mitchell, Mr. and Mrs. W. A. Hawgood, Mrs. Guy Moulthrop, Mr. and Mrs. W. E. Chapman, J. T. Kelley, Mr. and Mrs. George Smart, Harvey D. Goulder, Henry Penton, G. C. Russel, R. C. Wetmore, Robert Logan, Louis Ford, Mr. and Mrs. G. C. Donaldson, N. J. Boylan, Mrs. Olmstead, Miss Lucie Fleming, T. R. Gillmore, R. K. Clark, Mr. and Mrs. Howard McDaniels, George Arnold, Henry Steinbrenner, Charles Williams, Mr. and Mrs. Guy Seigrist, John Mullen of Amherstburg, Ont., George Craig of Toledo, Edward Mehl of Erie, F. H. Osborn of Chicago, F. A. Meyers of Buffalo, F. H. Seither, Capt. Samuel Allen, Mr. and Mrs. Frank Seither, Capt. Henry Hinslea, Capt.

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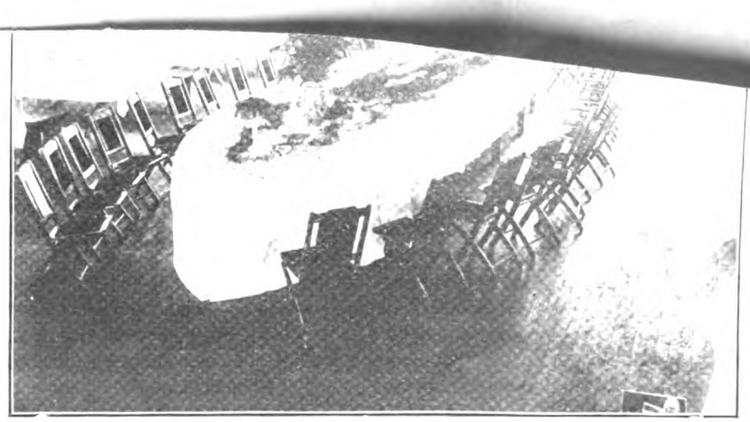
LINE.

The *Northwestern Miller* publishes the following story of the Anchor line, by William Van Wilten:

Few people realize the immensity of the traffic on the great lakes of America. It is the habit of the country to take such things as a matter of course and not to dwell very much on the beginning or the development of trade arteries. Everything grows so rapidly, when it grows at all, in this country, that the strides made by lake commerce have been scarcely noticed by the general public. More talk is made concerning the Suez canal and its comparatively insignificant tonnage than of the Sault Ste. Marie, where the traffic which passes through the locks in a single season amounts to nearly 55,000,000 tons with a value of more than $500,000,000.



THE SPEAKERS' TABLE IN THE MOLD LOFT AT THE LORAIN YARD IN HONOR OF THE LAUNCHING OF THE JOHN A. DONALDSON.

To stand in the pretty little park beside traverse the lakes to a 10,000-ton freighter carrying a crew of 50. It is a singular fact that while the Mississippi river traffic has been rapidly dwindling to nothing, three ships are attractive in every way, and on two of them, the Juniata and Tionesta, they are not surpassed by anything on the great lakes.

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...to the Anchor line ...is the new steel steamer Wissahickon, of 5,000 tons package freight carrying capacity. She was launched at the Buffalo yard of the American Ship Building Co. on July 11, 1907, and has now gone into active service. The christening ceremony was performed by Miss Amy Gertrude Payne, daughter of the president of the company.

Besides the fleet of boats named, the Anchor line has also, in service during this season, under charter, the steel steamers Lackawanna and Scranton, each of 2,500 tons carrying capacity.

Frank J. Firth was the president of the Erie & Western Transportation Co. until June, 1905, when he declined re-election at the annual meeting, after having rounded out a quarter of a century of good service and faithful and efficient attention to the interests of the company. John E. Payne, who for many years has been in the service of the Pennsylvania Railroad Co. and the Erie & Western Transportation Co., was elected to succeed him. He brought to the service of the company a broad comprehension of the traffic, a knowledge of its sources of supply and an intelligent and earnest desire for the welfare and expansion of the line.

Much of the success of the Anchor line is due to E. T. Evans, who was its first western manager. He was a pioneer in the business and built the first iron boat for cargo service on the great lakes. This was in 1862, the steamer Merchant, of 709 tons. The Merchant was antedated by the United States steamer Michigan, now the Wolverine, which was the first of the iron vessels on the great lakes. It may be interesting to the general public to know that the Michigan was built in Pittsburg, Pa., taken apart and the material transported by canal and teams to Erie, Pa., where the vessel was reconstructed and put into service as the representative of the United States navy on the great lakes.

Mr. Evans' reminiscences of early days in lake transportation are wonderfully interesting to the student of commerce and his story of the growth of the line, all accomplished during his own business life, sounds like a romance, but is a plain narration of wonderful fact, stranger than any fiction.

A few years ago he was made vice president of the Erie & Western Transportation Co., and occupied that position until June 1, 1906, when he declined re-appointment, and at that time became president of two subsidiary companies, the Western Warehousing Co., of Chicago, Ill., and the Connecting Terminal Railroad Co. at

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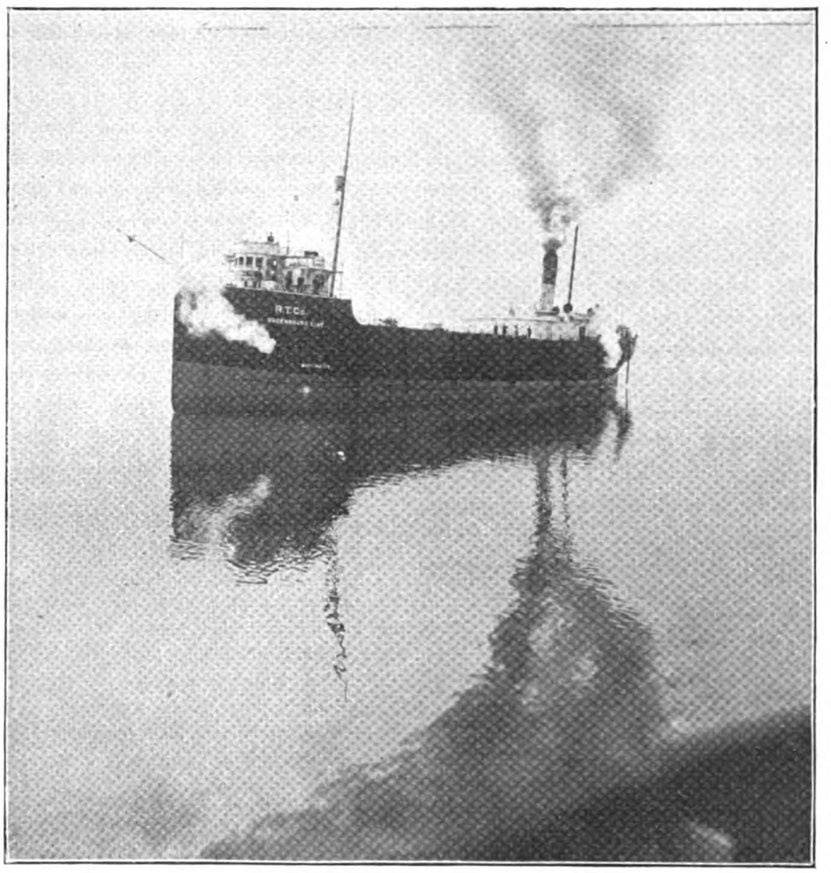

THE PACKAGE FREIGHTER BURLINGTON.

Buffalo, N. Y., which positions he still occupies.

The present officers of the company are: John E. Payne, president, Philadelphia; P. R. Perkins, treasurer, Philadelphia; Frank Staley, secretary, Philadelphia; Walter Thayer, eastern manager, Philadelphia; J. C. Evans, western manager Buffalo, N. Y.; M. Riebenack, comptroller Philadelphia; E. A. Stockton, assistant comptroller, Philadelphia; Jefferson Justice, assistant to comptroller, Philadelphia; J. F. Reynolds, auditor, Philadelphia; W. J. Boddy, assistant auditor, Philadelphia; Charles E. Markham, general passenger agent, Buffalo, N. Y.

In addition to the splendid fleet of steamers of the Anchor line, the Erie & Western Transportation Co. owns valuable terminal facilities at Buffalo, N. Y., Erie, Pa., Detroit, Mich., and Chicago, Ill. At other ports it uses the terminal facilities of the railroads with which it connects.

At Buffalo, N. Y., the company owns property with a frontage of 492 ft. on the city side of the Buffalo river, with commodious warehouses and offices. It has on the lake side of the Blackwell canal a frontage of about 1,641 ft., occupied by a 1,000,000-bu. elevator and by two large freight houses.

At Erie, Pa., it has about 39 acres of land fronting on the bay, on which there are three elevators with a combined capacity of 1,250,000 bu. On the same pier with the elevators it has a small westbound freight house. On its principal pier, which is 300 ft. wide, there are two large freight houses, one 100 ft. wide by 935 ft. long, and the other 110 ft. wide by 900 ft. long. This pier is now being extended 220 ft. further into the bay, and the two freight houses referred to will be extended 200 ft. each in length. This work is now in progress.

At Detroit, Mich., the company owns a water frontage on the Detroit river 467 ft. long, with freight houses, offices and warehouses. At Chicago, Ill., the Anchor line has about 716 ft. of frontage on the Chicago river, extending back from the river about 189 ft.

At Cleveland, O., the Anchor line uses mainly the docks of the Pennsylvania company. At Milwaukee, Wis., the line uses part of the terminals of the Chicago, Milwaukee & St. Paul road, and also delivers and takes freight from terminals of Chicago & Northwestern railway and Wisconsin Central railway.

At Duluth, Minn., interchange of business is made at the docks of the Great Northern railway, Northern Pacific railway and the Chicago, St. Paul, Minneapolis & Omaha railway. Use is also made of what is known as the City Dock at Duluth for local Duluth business.

The Erie & Western Transportation Co. is now owned entirely by the Pennsylvania Railroad Co. and its bills of lading and contracts are as substantial and protective as bank drafts could be. The line gives very prompt and careful service, and its time in transportation of both eastbound and westbound freight is beyond criticism.

The shipper comes in contact with a carrier's representative in the field and much of its success must depend upon the intelligence and zeal of this important branch of its organization. Millers and handlers of mill products are given especial attention by the Anchor line's well known representatives consisting of the following: George W. Smith, agent and I. C. Furber, traveling freight agent, Minneapolis, Minn., and the following western agents: W. H. Johnson, general western agent, Chicago, Ill.; M. S. Mead, agent, Erie, Pa.; J. C. Thomson, agent, Milwaukee, Wis.; W. H. Millard, agent, Houghton and Hancock, Mich.; D. A. Christy, agent, Duluth, Minn.; W. T. Midlam, agent, St. Louis, Mo.; C. E. Clapp, agent, Kansas City, Mo.

At the head of this staff is J. C. Evans, western manager, a man who has won for himself the respect and regard of shippers and especially millers by his earnest and unremitting devotion to his duty, his exceeding fairness and his frankness and sterling integrity.

In this connection, mention should be made of the late Charles W. Clawson, who for many years, was the Minneapolis agent of the Anchor line and the Union line. He died on Dec. 24, 1907, after long and faithful service during which he won the confidence and esteem not only of his employers but also of the shippers of the Minneapolis and St. Paul territory. More than passing tribute is due to the character and work of this honored veteran in the ranks of the country's freight agents. He was conscientious, efficient and zealous; a good citizen and a useful and highly respected member of society.

The Anchor line from its president to its least important representative, shows no trace whatever of that arrogant and domineering tendency which, at one time, used to characterize the attitude of some of the carriers toward shippers. On the contrary, it exemplifies a better relation between these contracting parties; a wholesome and enlightened desire to meet the shipper with every proper facility for the handling of his commodity; to extend to him every possible convenience and to treat him, under all conditions, with consideration, courtesy and fairness. The entire staff of the Anchor line is thoroughly imbued with this spir-

(Continued on page 34.)

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THE MARINE REVIEW

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May 7, 1908.

A QUIET YEAR.

Apparently 1908 has settled down to be a quiet year. The executive committee of the Lake Carriers' Association met in Cleveland this week to consider the labor problem; but there cannot be much of a labor problem without work. One shipper present remarked that at this time last year he had sold 3,000,000 tons of ore, whereas up to the present time this year he has not sold a single pound. There is only one sensible thing to do—to take the situation philosophically and to admit that the country needs a rest. Things have been going too fast a pace and a let-up had to come some time. It is a striking commentary to make, however, upon the fair-mindedness of the men in control of the lake situation that they have no disposition whatever to take advantage of natural conditions. They have no desire to impose upon labor. The same wage scale will be paid that was paid when prosperity was at its highest point.

No trouble is expected over the declaration for the open shop. The men recognize the situation that exists and accept it. Very few of the boats are of course running, but such as were compelled to start on special orders have had no difficulty in getting a full crew; and all engineers that have been ordered to their boats have cheerfully gone. Nor are the dock managers meeting with any special trouble. They have succeeded in entering into individual agreements with the ore handlers at Fairport, Ashtabula and Conneaut, and anticipate no trouble at other ports. The movement of ore will of course for several weeks yet be light. The amount that will be delivered at Lake ports during May will be nominal. In fact, Superior is the only port at present prepared to ship any ore at all.

Vessel owners will meet in Cleveland on Tuesday next to discuss the general opening of navigation. It is quite likely that an agreement will be reached to make the general start not earlier than June 1, and it is possible that it may be postponed until an even later date. The fact is that there is no business in sight and the lake situation cannot be expected to materially mend until ore now in stock piles is consumed. This is the wisest course to pursue if prices are to be maintained and serious losses averted.

Attempts are made to ascribe the present depressed state of industry to local conditions, but the facts are that depression is universal. It may be more acutely felt in this country owing to the vastness of its internal market, but it is nevertheless quite as pronounced elsewhere. This is especially true of Great Britain where the output of ship tonnage is less than it has been in any year since 1884. Apparently it is a period for the digestion of surplus products. The wheels of industry have been revolving too fast. With drastic retrenchment necessary on a universal scale it is comforting to realize that the lake business is probably in sounder condition and under better management than any industry of similar magnitude in the world. The one thing requisite is for all to approach the situation fairly and frankly. It is not the time for either employer or employe to be unreasonable. Wisely handled the present situation will work out a permanent benefit to all parties interested. The result will be a better understanding all around, with a general recognition that all are working in a common business and are willing that each shall have his just share of profit. The policy to be pursued should be one of mutual helpfulness.

TALKS ON BOILER CIRCULATION.—I.

Trace out the source of power in all the steamships upon the high seas of the world, naval and commercial, and it will be found that the Scotch boiler is doing business in a very large percentage of the tonnage. The Scotch boiler is, as its name implies, of foreign origin, and has a history, both ancient and honorable. Its record for capacity, safety, and longevity is without parallel. In the British Isles and the European continent it is regarded as the standard of excellence, and is extensively employed for marine service, as well as stationary duty.

Briefly described, the Scotch boiler is a horizontal, internal-furnace, return-tubular boiler, complete in itself, and constructed entirely of steel. Its shell and furnaces are cylindrical in form. The function of its external shell is that of resisting internal pressure, its quality and thickness being the measure of its power of resistance.

According to required coal burning capacity, one or several furnaces are employed. These are made in various ways, sometimes with plain sheets with riveted seams, but more frequently with seamless corrugated tubes of large diameter, designed to resist external pressure, extending from head to head and carrying the grates.

The products of combustion pass from the furnaces to a combustion chamber in the rear, of suitable proportions to allow the gases to thoroughly intermix, and then return through a multitude of submerged tubes of small diameter to the front, where the unconsumed gases are discharged to the chimney or smokestack.

When designed for marine service,

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the combustion chamber is made of steel plates, so constructed and placed that it is entirely encompassed with water. This is called a "water back." When designed for land or stationary service, it is customary to dispense with the "water back" and substitute a "dry back," in other words, the shell is extended, a removable head bolted on, and the interior of the extension lined with fire brick, set in fire clay, and made air tight. Boilers of the "dry back" type are commonly described in England as "Clydes"—baffle-back boilers. Their popular American name is somewhat lengthy, but descriptive. They are widely known as horizontal, internal-furnace, return-tubular boilers, this title plainly distinguishing them from other forms of internal-furnace boilers, as well as from the common return-tubular type.

A specification of the numerous strong points of merit which these boilers possess is needless in view of their long-time employment in the industrial world. Although, however, boilers of the Scotch and horizontal, internal-furnace, return-tubular types embody many of the qualities essential to perfection in boilers, and are justly entitled to high standing and esteem in the market, they are, as hitherto designed and built, subject to one adverse criticism. They are minus the important quality of functional circulation. This statement is not written or designed to be taken as an item of news, the fact being well known to mechanical and consulting engineers, practical engineers in charge of marine and stationary boilers, and manufacturers of boilers. A multitude of owners are also well aware of it, as a thermometric test of boilers under steam will show that this condition generally exists.

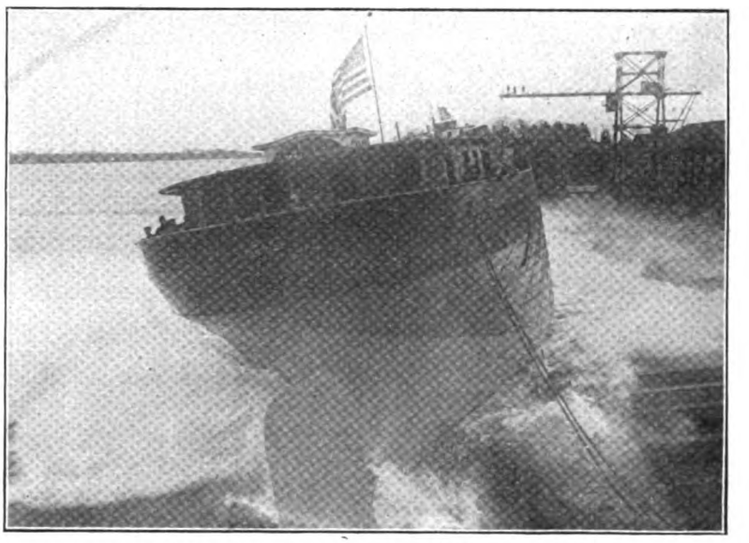
It is reasonable to say that circulation of the water contents of a boiler is as essential to its ability to fulfill its function as a steam generator, day by day, and year after year, as the natural circulation of blood in the human body is to its energy and capacity for work, and its ability to resist decay and delay the date of demise. It is furthermore fair to say that a boiler structurally incompetent to promote circulation, or not equipped with a device or system which will produce natural and complete circulation, however excellent it will be in material and workmanship, is imperfect, and in operation falls short of fulfilling to the utmost possible extent its duty, mission, and the rightful expectation of its owner.

It is plain that an automatic system of circulation is the one thing needful, and, until such system is installed, engineers and others in charge of Scotch and horizontal, internal-furnace, return-tubular boilers will continue to experience the troubles arising from defective circulation in boilers of this type. E. T. C.

BULK FREIGHTER CORNELIUS LAUNCHED.

The bulk freighter Adam E. Cornelius was launched from the St. Clair yard of the Great Lakes Engineering Works on Saturday last and was named by Miss Emma Reiser, of Buffalo. Vessels have been christened on the lakes by wives, daughters, sisters, aunts, granddaughters, nieces, cousins and stenographers but this is the first in recent years that has been named by the fiancee. A special car carried the guests from Detroit to the ship yard. Mr. Cornelius is a member of the firm of Boland & Cornelius, of Buffalo. After the launching a luncheon was served at the ship yard. President Antonio C. Pessano, of the Great Lakes Engineering Works, presided, and responses were made by J. J. Boland, Mr. Cornelius, Capt. C. H. Westcott, Mr. Tuttle, and others.

The Cornelius is 440 ft. over all, 420 ft. keel, 52 ft. beam and 28 ft. deep. She has 12 hatches spaced 24-ft. centers. Her engines are triple-expansion with cylinders 21, 34½ and 57 in. diameters by 42-in. stroke. Steam will be supplied by Scotch boilers, 13 ft. by 11 ft. 6 in., equipped with Great Lakes heated draft and allowed a working pressure of 180 lbs. She will carry 7,500 gross tons of ore.



LAUNCHING THE ADAM E. CORNELIUS AT ST. CLAIR.

ANSWERS TO QUESTIONS.

Kindly answer the following questions through your columns, and oblige A SUBSCRIBER.

1. Is there any law which forbids steamers meeting in a channel 150 ft. wide? Ans. No.

2. What would you consider suitable anchors and chain for a steamer of 5,000 gross tons; also give length of chain? Ans. Two anchors each about 6,000 lbs., with about 90 fathoms of 2½-inch chain attached to each.

3. Why does a master report collision? Ans. One reason is that the law requires it. Other reasons are in the collection of insurance and in making a case for insurance, etc.

One of the dredges of the Detroit Dredging Co.'s fleet while bound up from Fairport last fall sank six miles east of Sandusky. Capt. Harris W. Baker, the wrecker, of Detroit, sent his men to raise her on April 1 last and found that she had entirely turned over with her bottom side up and her spars and cranes sunk deep into mud at a depth of 12 ft. or more. The divers began the work of raising her but found the water so cold that after several days of effort it was decided to abandon her until warm weather comes. Capt. Baker will make a further attempt some time in June.

Capt. Harris W. Baker, of Detroit, has bought the steamer Douglass and is now equipping her as a wrecker. A derrick spar is being installed and steam pumps are being put aboard. She will act as a companion to the wrecker T. W. Snook.

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ASBESTOS COMPOSITION FLOORING.

The Asbestos Composition Flooring Co., 967 North California avenue, Chicago, are meeting with success in installing their flooring on lake steamers. There is published herewith a photograph showing a section of the flooring on the steamer Eastern States of the Detroit and Buffalo line. The field of this floor is dark green with white Grecian border and white lines to mark the squares. The white is all inlaid, wears uniformly, and makes a most attractive flooring. It is both elastic and durable and can be adapted to any surface. It is absolutely sanitary and without odor. The company has installed this flooring on the Western States of the Detroit and Buffalo line, and on the City of Alpena, City of Detroit and City of Mackinaw of the Detroit and Cleveland line. The company has laid flooring on about 100 other boats in solid colors with cove base, seamless and watertight. The adaptability of this composition is remarkable. It can be used on any surface, including steel, and is susceptible of a high polish, like glass, or a dull finish. It can be colored to harmonize with woodwork or any scheme of decoration. It has also the merit of being very light, weighing only, when completed, 2½ lbs. to the square foot. The company manufactures all of its material at its factory, 967 North California avenue.

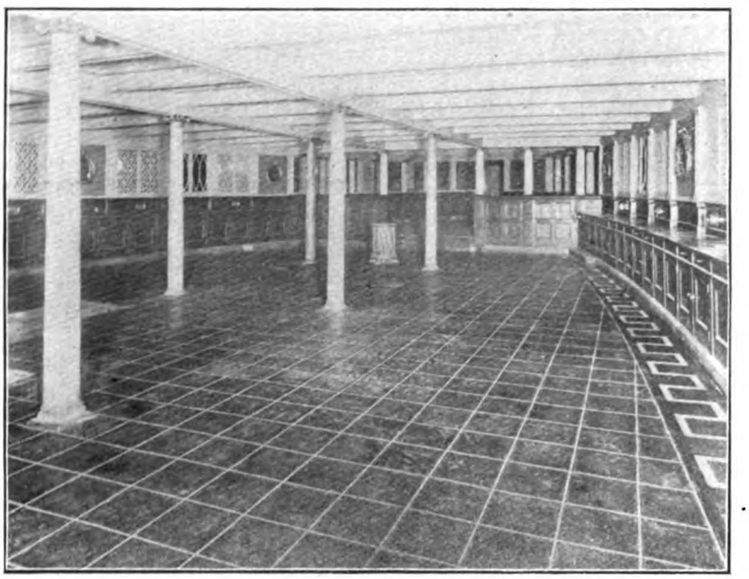


PHOTO OF ASBESTOS COMPOSITION FLOORING IN THE STEAMER EASTERN STATES.

STORY OF THE ANCHOR LINE.

(Continued from page 31.)

it and it finds its reward in an increasing popularity and favor.

This company pre-eminently seeks the business, desires it, encourages it and strives to build it up, but, withal, it does so without granting to one shipper concessions which it withholds from another, nor has it ever sought by improper or questionable methods to stimulate the business it receives.

Absolutely honorable and reliable in its methods, with principles which for straightforwardness and uprightness are unquestionable, this large and steadily increasing factor in lake traffic, with its splendid fleet of steamers, its loyal and devoted officers and its corps of zealous representatives constitutes in itself an organization notable for sincerity, integrity, enterprise and real progress.

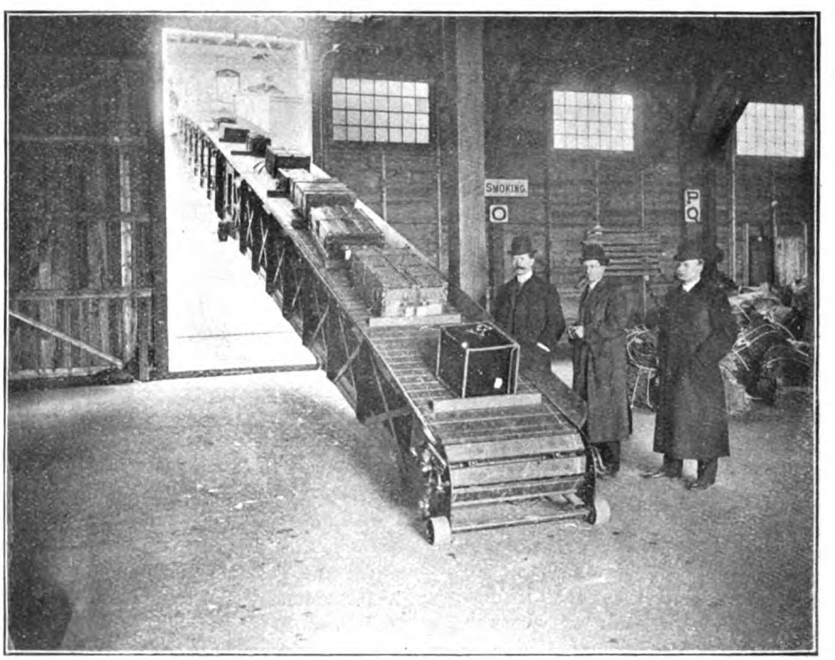
PERSONAL.

Robert W. Hunt & Co. have established an analytical chemical laboratory in connection with their St. Louis office, 1445 Syndicate Trust building. In addition to general analytical work, particular attention will be given to analyses of and advice on iron foundry mixtures. This work and the laboratory will be under the direction of J. B. Emerson, who for several years past had charge of the metallurgical part of the wheel foundry of the Mt. Vernon Car Co. Previous to that engagement he was in the employ of the Illinois Steel Co.

Walter D. Munson, president of the Munson Steamship line, died suddenly at his home in New York last week. Heart disease was the cause of death. In addition to the Munson line, Mr. Munson was interested in the Atlantic & Mexican Gulf Steamship Co., of which he was vice president and a director, and the International Coal Co., of which he was secretary-treasurer.

SPENCE CONVEYORS.

The accompanying photograph shows the 60-ft. conveyor loading baggage on the Cunard liner Lusitania at the Cunard pier, New York. The Spence Manufacturing Co., St. Paul, Minn., are the sole manufacturers of this patent conveying machinery, which has proved to be of great service in handling package freight aboard ship.



SPENCE CONVEYOR ON THE CUNARD PIER, NEW YORK, LOADING THE CUNARD LINER LUSITANIA.

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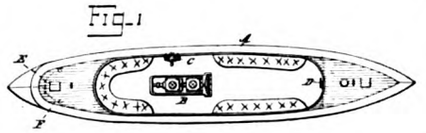
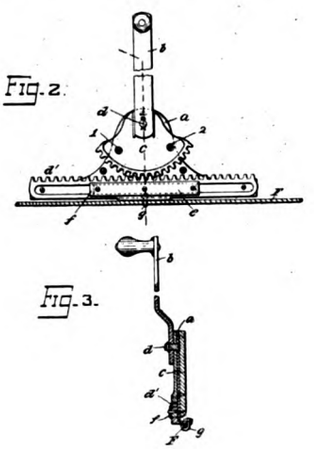
STEERING DEVICE FOR POWER BOATS.

A steering device which can be attached to power boats at any point in the line of movement of the tiller rope, and can be removed if desired without interfering with the ordinary steering arrangement, has been invented by James A. Garrett, of Auburn, N. Y. The construction of this device is such that it can be applied without breaking the tiller rope, is simple and inexpensive to build.

Fig. 1 in the accompanying drawings is a plan view of the power boat showing the device located near the engine. Fig. 2 is an enlarged elevation of the device, and Fig. 3 is a vertical section on the line x-x of Fig. 2. The tiller rope F is shown led through suitable guides to the steering wheel in the bow of the boat. When the engineer is the only one familiar to the surrounding waters, or is alone in the boat when under way, it is intended that this device will be employed in steering, being located within easy reach of the engineer while operating the engine.

A supporting plate *a* is secured to the side—in this instance the coaming—of the boat. A lever *b* is attached to a toothed segment *c* rockable on a spindle *d* on the plate *a* and secured thereon in any suitable manner. The segment meshes with a rack bar *d*, which moves upon a slide support *e* secured to the plate and projecting through a longitudinal slot in the rack bar, the latter being retained in its operative position on the slide support by a plate *f* fastened thereto. The tiller rope is firmly clamped by a hook bolt *g* to a horizontal extension of the under side of the rack bar, which passes below and rearwards of the plate and coaming to meet the tiller rope. Holes 1 and 2, shown in the segment, are there merely for convenience in removing the fastenings of the plate.

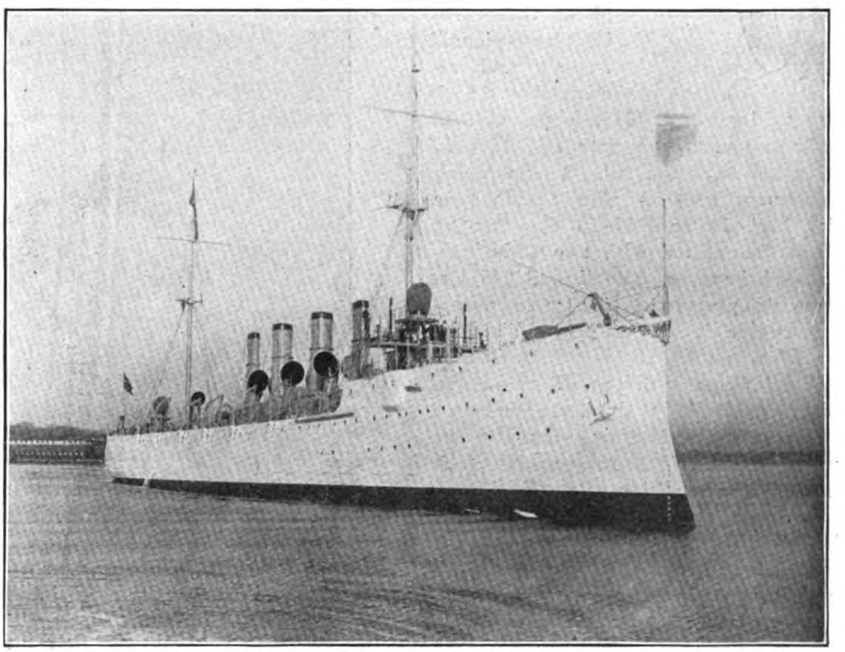




A movement of the lever will thus rock the segment which again moves the rack bar to which the tiller rope is secured so that the rudder will be moved and the boat steered in the desired direction.

SCOUT CRUISER BIRMINGHAM.

The scout cruiser Birmingham was delivered to the navy yard by the Fore River Ship Building Co., Quincy, Mass., on April 10, less than a month after the commencement of her official trials, the vessel being practically completed at that time except for final painting.



SCOUT CRUISER BIRMINGHAM.

NEW M'MYLER CAR DUMP AT TOLEDO.

The Hocking Valley Ry. Co. put its new McMyler car dump in commission on May 2 by unloading the steamer City of Mt. Clemens with coal for the account of the Toledo Fuel Co. This machine is of the latest type, made by the McMyler Mfg. Co., and replaces the old Brown hoist at the foot of Buffalo street. It will handle the new 50-ton cars adopted by the railway company, as well as all open cars of any size or type. The erection of the new loading plant ends a long controversy with the city of Toledo on account of the lapping of the Brown hoist onto Buffalo street. The courts had ordered the railway company to take down that part of the machinery which stood on the street, but a truce was arranged until the railway company was ready to entirely remove the old machinery.

The Smooth-On Manufacturing Co., Jersey City, N. J., has just issued a catalog concerning its new Smooth-On coated corrugated gasket. The company will be pleased to send a Smooth-On coated corrugated gasket free to any engineer. The company represents that the Smooth-On gasket is superior to all others, not because it is corrugated but because it is coated with Smooth-On elastic iron cement. This cement expands and contracts the same as iron; the gasket being of steel expands and contracts with the piping. It is not simply tight when hot and then loose when cold. It is always tight and can be used for steam, air, water and oil with absolute security.

The Lane & DeGroot Co., 17 Battery Place, New York, has just issued a catalog descriptive of their metallic life boats and rafts as well as wooden boats. This company has been reorganized by A. P. Lundin, of the Welin Quadrant Davit, and is now in position to fill all orders promptly. It will be noted that they are also builders of steam and power launches and of the Engelhardt collapsible life boats.

The Mosher Water-Tube Boiler Co. announce their removal to their new offices in the Hudson Cortlandt Terminal building, 30 Church street, New York.

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COLLINGWOOD SHIP BUILDING CO.

THE plan published on the opposite page will show at a glance the general layout of the Collingwood Ship Building Co.'s plant at Collingwood, Ont. One of the most important features about the works is the splendid stone and cement dry dock 520 ft. long and 78 ft. wide with 58 ft. entrance at the gate and 16½ ft. of water over the sill. The pumping equipment consists of a Scotch type dry back boiler 10½ ft. diameter by 15 ft. long fitted with two 42-in. corrugated furnaces and allowed 135 lbs. working pressure. The main pumping engine is vertical 22-in. diameter by 24-in. stroke, driving a large centrifugal pump with two 28-in. suction pipes and a 40-in. discharge and two 10-in. centrifugal drain pumps. The pumping time for emptying the dock is 2 hours and filling time 45 minutes.

A large electric crane travels the length of the dock and handles the material to and from the dry dock with sufficient reach to place material on the deck of a boat in the dock. The equipment is especially designed for turning out quick repair work.

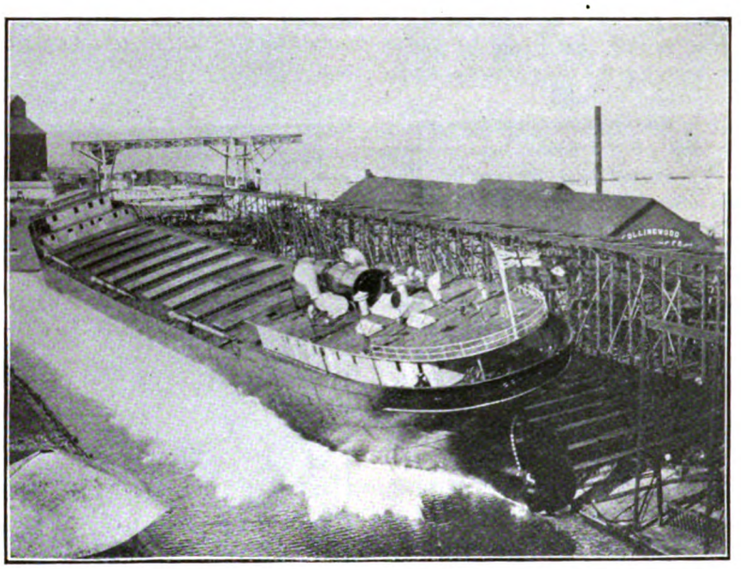
The punch shop is well supplied with large modern tools and hoists and has an average capacity of 5 tons material per hour.

An electric traveling gantry crane is installed for unloading cars and serving the stock yard. A 15-ton capacity electric traveling gantry crane with 65 ft. clear head room serves the 540 ft. building berth directly in front of the punch shop. There is a machine repair shop and pipe shop at the north end of the punch shed. East of these shops are the joiner shop and pattern shop, blacksmith shop and furnaces and bending slabs, all modern buildings and equipments.

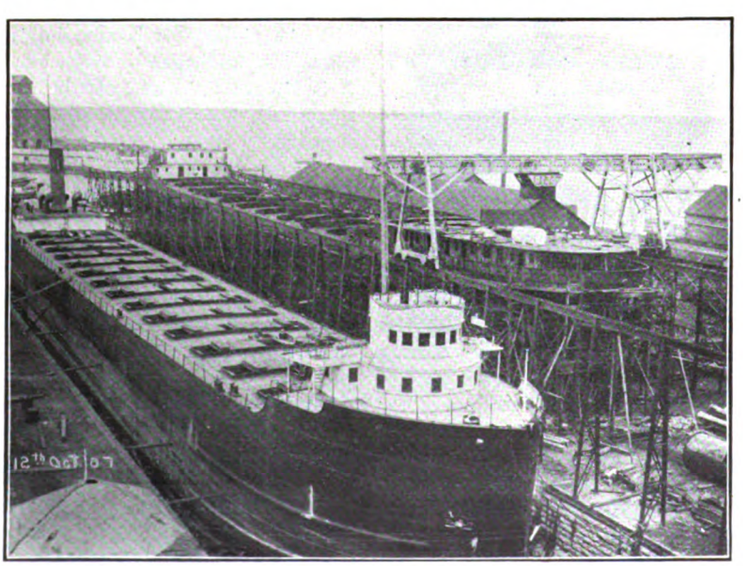
The general office building is at the southeast corner of the plant; the ground floor contains general store room, wash room and lavatories; the upper floor is occupied by the accountants and draughtsmen.

The machine shop, foundry and pattern storage shops are at the south end of the property and are of most up-to-date and substantial design and construction, with heavy steel framing, brick walls and slate roofs. The tools are of the best American make and are capable of turning out castings and machinery of the largest class. A 40-ton electric traveling crane with 60-ft. span commands the foundry and machine shop. The boiler shop and power house are located southwest of the dry dock; these buildings are of similar design and construction as the machine shop and foundry. The main features of the equipment of the boiler shop consist of a 40-ton electric traveling crane, 60-ft. span; a 75-ton hydraulic traveling crane serving the riveter; a 12-ft. vertical rolls capable of bending the heaviest boiler plates; a 5-stage, 35-ton to 175-ton, 11-ft. gap hydraulic bull riveter; besides punches, shears, planer and radial drills, of the best American makes. This shop is capable of turning out steam boilers of the largest and heaviest types.

The power house is equipped with three H. T. boilers 72-in. diameter by 16 ft. long, allowed 150 lbs. working pressure, and the engines are Corliss tandem compound condensing 15 and 30 in. diameter of cylinders by 36-in. stroke, 95 R. P. M., driving two 100-K. W. direct-current, 250-volt generators, which supply power to all cranes and line shaft motors through-



THE LAUNCHING OF THE COLLINGWOOD FOR THE FARRAR TRANSPORTATION CO.



VIEW OF THE YARD OF THE COLLINGWOOD SHIP BUILDING CO. SHOWING THE MIDLAND PRINCE IN DRY DOCK.

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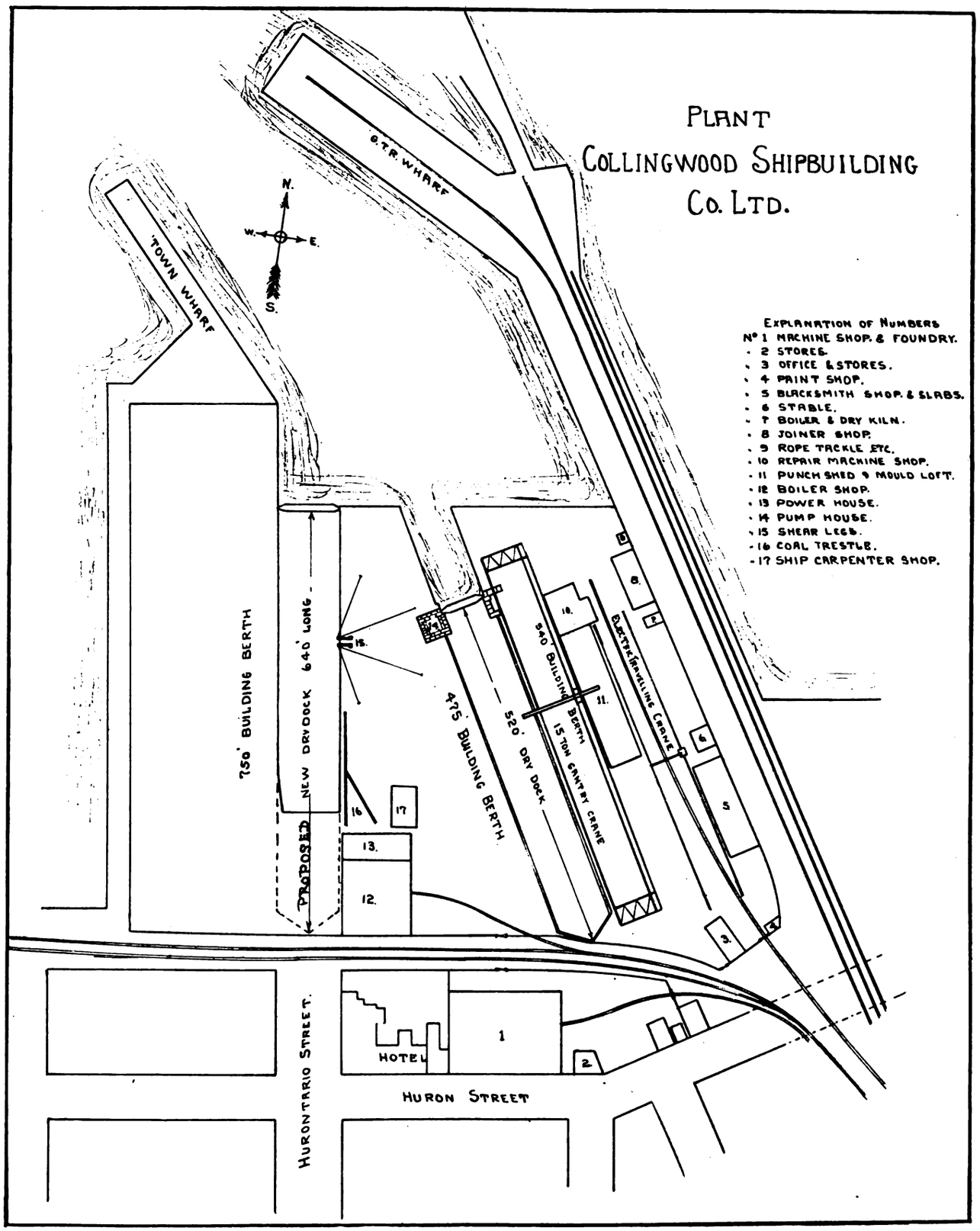

out the plant. There is also two cross compound air compressors and an independent horizontal air pump and condenser.

The whole plant is equipped with compressed air pipe lines, pneumatic tools and industrial railways. There is a steam-driven shear legs of 75 tons capacity at the west slip, and the company have lately acquired the property west of this slip to build a new dry dock and a 740-ft. ship building berth. A punch shop will be erected to serve the work in this new dry dock and ship building berth and a 15-ton electric gantry crane will be placed there similar to the one in front of the present punch shop.

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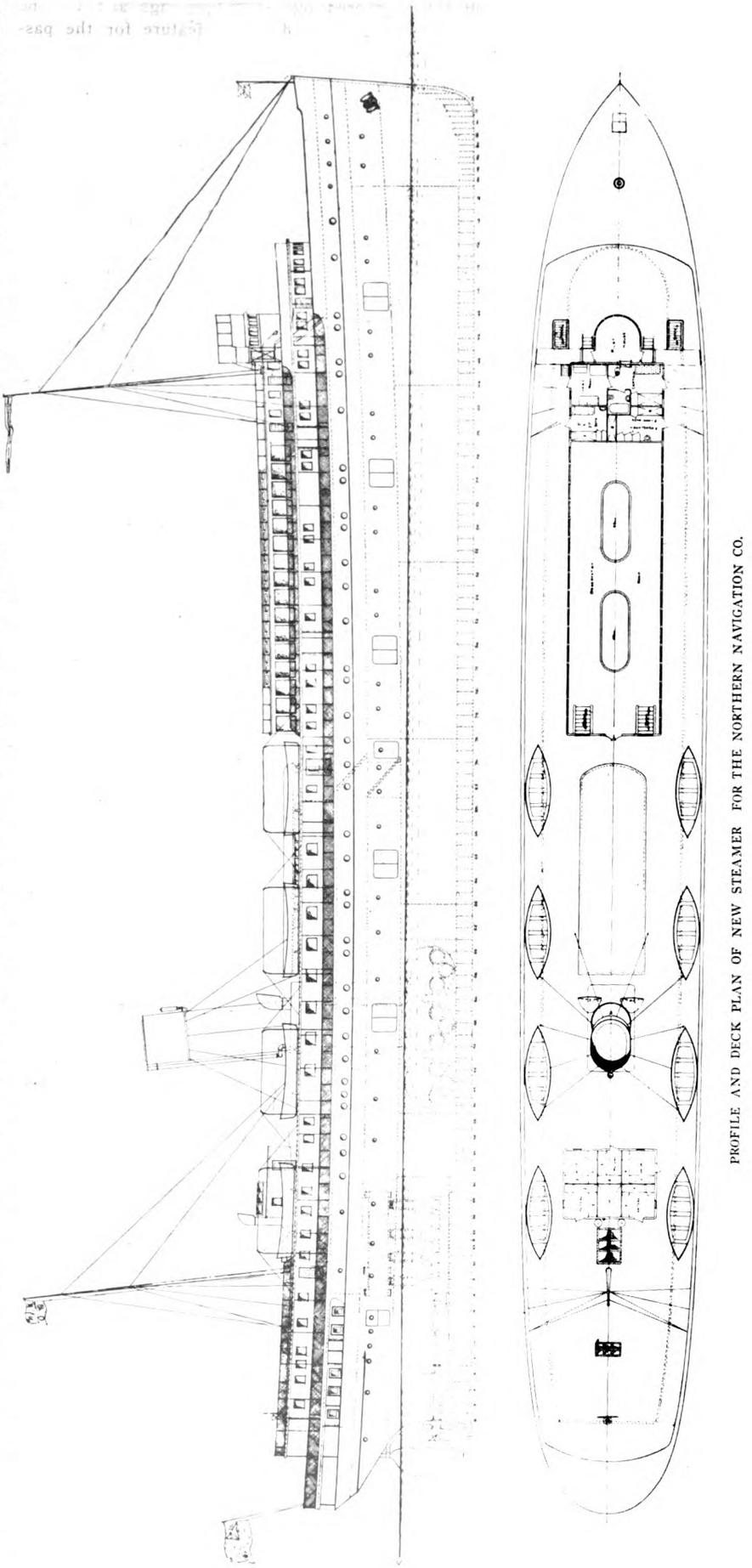
The water front of the company is finished off in a most substantial manner with dressed stone docks with a depth of 20 ft. of water at these docks. In fact the whole plant is of substantial appearance in its works and buildings, and while ship building in Canada has not proven a paying investment up to the present, the prominent men behind the company have faith in the future of the business.

The directors are Alexander McDougall, Duluth, president; Thomas Long, Toronto, vice president; Sanford H. Lindsay, Collingwood, secretary-treasurer; Capt. P. M. Campbell, Collingwood; H. B. Smith, Owen Sound; Simon Dyment, Barrie; John Stark, Toronto; W. I. Gear, Montreal; Louis Coste, Ottawa; and James M. Smith, manager.

The company has been in operation seven years and the most prominent of their output in ships are the Huronic, Agawa, W. D. Matthews, Midland King, Emerson, Waubaushene, Ungava, Midland Prince, Helena, and Collingwood.

NEW STEAMER FOR NORTHERN NAVIGATION CO.

The company has lately contracted to build a large passenger and package freight steel steamer for the Northern Navigation Co., for the trade from Windsor and Sarnia to Port Arthur and Duluth. This ship will be 365 ft. long, 50 ft. beam, and will have main deck, spar deck and awning deck, all steel, with freight accommodation below the spar deck and passenger accommodations on the spar deck, awning deck and promenade deck. The ship will be built on the channel system with water bottom tanks, and the freighthold will be divided into a large number of compartments with watertight bulkheads. The propelling power will consist of six 12-ft. 6-in. Scotch boilers, 250 lbs. working pressure, all connected with forced draft, and the propelling engines will be vertical, quadruple expansion with cylinders 24, 35, 52 and 80-in. diameters by 42-in. stroke. It is expected that the power developed will be about 5,000 I. H. P. The cargo capacity will be about 3,000 tons of package freight, and as the boat makes weekly trips and handles a great deal of package freight at the different way ports it will be necessary to maintain a scheduled speed of about 17 miles per hour on her average run. Owing to unavoidable delays which occur from time to time it it necessary to have considerable reserve power and the boat will be capable of running over 20 miles per



PROFILE AND DECK PLAN OF NEW STEAMER FOR THE NORTHERN NAVIGATION CO.

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hour when called on to do so.

She will be equipped with two pole spars and single smoke funnel, will have straight stem and elliptical stern, and from the plans and models already produced the ship will be of very handsome appearance. The hull and machinery will be built to the highest classification of the Great Lakes Register.

The cabins will be capable of accommodating over 400 first class passengers, about 70 second class passengers, and about 100 of a crew.

The first class dining room will seat 180 people. The galley, store rooms, refrigerators and pantries will be large and will be equipped with latest modern devices. The passengers will enter on the main deck amidship and pass up a broad stairway to the waiting room on the spar deck where they will secure accommodations from the purser and steward, whose offices and quarters are facing the waiting room. The staterooms are located forward and aft of this waiting room with bath rooms, closets and lavatories grouped conveniently, and the staterooms and quarters on this deck will be lighted by 20-in. brass deadlights arranged along each side. A broad stairway leads from the waiting room to the social hall on the awning deck. This room is designed for the purpose of a general assembly room. The dining room will be directly aft of this social hall and state rooms and parlor suites directly forward with a drawing room forward of the parlor suites. The galley and stores are directly aft of the dining room and the smoking room and buffet is at the after end of this deck.

A prominent feature of the awning deck will be a clear 6-ft. walk at each side of the ship leading from forward to aft, making a very desirable promenade. Leading directly from the social hall are two stairways to the observation room on the promenade deck. This observation room will be 80 ft. long and 28 ft. wide and will be practically a glass house or sun parlor. It will be conveniently arranged to be used for a ball room or place of entertainment. Directly forward of this observation room will be the captain's and navigating officer's quarters and the pilot house and bridge, and directly in front of the pilot house will be a large clear deck for passengers; a clear promenade will be arranged on this deck leading from in front of the pilot house clear around on each side and aft of midships of the boat. This will be covered over with awnings and will be a very desirable feature for the passengers' pleasure. The accommodations throughout will be finished handsomely in hardwood paneling, oak, mahogany, etc. Running hot and cold water will be connected to all state rooms, bath rooms and toilet rooms, and a central station system of call bells will be fitted and connected to all passengers' quarters and state rooms. It is the intention to build a boat that will be superior in every way to any ship at present in the Lake Superior trade.

SUMMARY OF NAVAL CONSTRUCTION.

Following is the summary of naval construction as compiled by the bureau of construction and repair, navy department. It is shown that the battleships Idaho and New Hampshire have been delivered to the government:

Name of Vessel.	Building at—	—1908— Per cent of completion. Mar. 1.	Apr. 1.
BATTLESHIPS.			
Idaho	Wm. Cramp & Sons	97.25	100.*
New Hampshire	New York S. B. Co.	99.30	100.**
South Carolina	Wm. Cramp & Sons	39.05	42.20
Michigan	New York S. B. Co.	45.00	48.60
Delaware	Newport News S. B. Co.	12.77	18.10
North Dakota	Fore River S. B. Co.	21.40	25.70
ARMORED CRUISERS.			
North Carolina	Newport News S. B. Co.	98.00	99.00
Montana	Newport News S. B. Co.	94.96	97.00
SCOUT CRUISERS.			
Chester	Bath Iron Works	98.38	99.10
Birmingham	Fore River S. B. Co.	96.69	99.10
Salem	Fore River S. B. Co.	94.31	95.20
TORPEDO BOAT DESTROYERS.			
T. B. Destroyer No. 17	Wm. Cramp & Sons	6.88	12.00
T. B. Detroyer No. 18	Wm. Cramp & Sons	6.80	10.80
T. B. Destroyer No. 19	New York S. B. Co.	8.40	11.50
T. B. Destroyer No. 20	Bath Iron Works	5.38	8.00
T. B. Destroyer No. 21	Bath Iron Works	4.91	7.80
SUBMARINE TORPEDO BOATS.			
Submarine T. B. No. 9	Fore River S. B. Co.	99.00	99.00
Submarine T. B. No. 13	Fore River S. B. Co.	23.00	30.00
Submarine T. B. No. 14	Fore River S. B. Co.	23.00	30.00
Submarine T. B. No. 15	Fore River S. B. Co.	23.00	30.10
Submarine T. B. No. 16	Fore River S. B. Co.	16.30	29.90
Submarine T. B. No. 17	Fore River S. B. Co.	7.50	10.30
Submarine T. B. No. 18	Fore River S. B. Co.	7.50	10.30
Submarine T. B. No. 19	Fore River S. B. Co.	7.50	10.30
COLLIERS.			
Vestal	Navy Yard, New York	69.40	76.40
Prometheus	Navy Yard, Mare Island	38.40	44.40
TUG BOATS.			
Patapsco	Navy Yard, Portsmouth	45.00	55.00
Patuxent	Navy Yard, Norfolk	45.50	55.30

*Delivered to government, at League Island Navy Yard, March 26, 1908.
**Delivered to government, at League Island Navy Yard, March 14, 1908.

IMPORTANT MARINE DECISION.

An opinion rendered in the United States district court by Judge De Haven decided that towage charges for taking a disabled vessel to a port of repair come within the "general average" clause of marine insurance policies.

It was in the suit in admiralty of Robert Dollar as trustee against La Fonciere Compagnie, brought to collect under a policy written by the defendant Jan. 26, 1903, to cover the steamer Grace Dollar for one year against the "perils of the sea." While entering Gray's Harbor, Aug. 31 of the same year on account of fog the channel was missed and the steamer grounded and injured her rudder. She was able to make the harbor under her own steam, and later was towed to Hoquiam, where she was to take on a cargo of lumber for San Francisco. A new rudder could not be put on at that place, and the underwriters consented that she be towed to San Francisco for repairs, provided she took a cargo of lumber aboard to make her less liable to founder in bad weather.

Dollar assessed the towage charges against the underwriting company, which objected on the ground that it was not "general," but "special," average. The court held that while the Grace Dollar would not have been safe in remaining at Gray's Harbor or Hoquiam, she would not have been in condition to brave the perils of the sea in a voyage except in tow. As it would have been necessary to tow her either to Portland or San Francisco for repairs, the underwriters could not object to San Francisco, as it was to that port she was chartered. The amount of the claim was but $41.25.

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New York Exposition of Safety Devices

Under the auspices of the American Museum of Safety Devices and Industrial Hygiene an exposition for showing the best methods of safeguarding workmen, protecting the general public, and displaying life-saving apparatus, is now being held at the McGraw building, 231 West Thirty-ninth street, New York City. The exhibits include apparatus for the prevention of accidents on railroads, street car lines, elevators and other systems of transportation. Methods of safeguarding the life, limb and health of the skilled and unskilled workman are shown, and are both varied and numerous. Apparatus for the prevention of loss of life and property by fire is a prominent feature, and includes all sorts of extinguishers from the hand grenade to the most powerful fire fighting equipment. With this exhibit there are several types of fireproof and emergency doors.

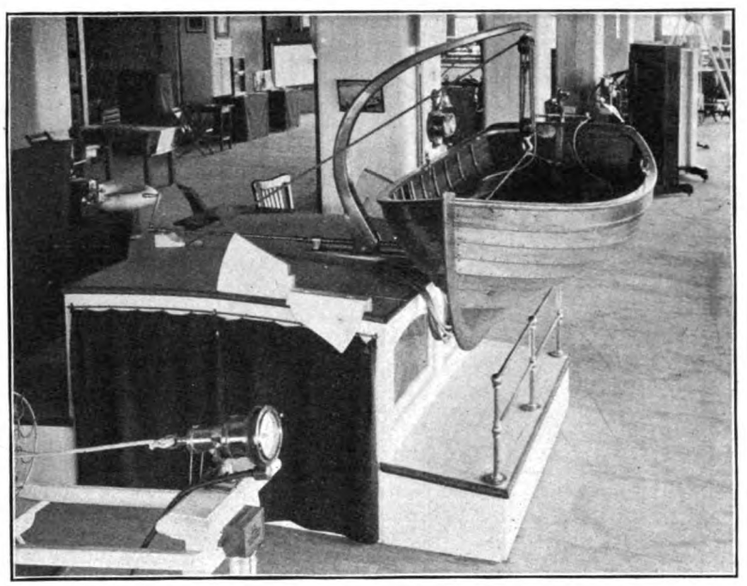

EXHIBIT OF THE WELIN QUADRANT DAVIT AT THE EXPOSITION OF SAFETY DEVICES.

The marine exhibits are mostly life-saving apparatus, and consist of life boats and rafts, buoys and belts, signalling equipment and types of operating gear. The exhibit of the Welin quadrant davit is particularly commendable, and consists of a section of the deck, rail, and cabin of a yacht, or other vessel, on which is installed a tender operated by a single davit. The tender, which is of goodly proportions and strongly built, can be swung clear of the vessel without any effort simply by the operation, single-handed, of a crank handle on a threaded spindle. The movement inboard and over the rail is performed by the demonstrator with equal ease. The davit used in this exhibit has been especially designed for use on good-sized power boats and yachts, where it is the practice to carry the tender or other boat on the top of the trunk cabin. Ordinary davits are, in such circumstances, more or less unsatisfactory, as it is impracticable to give them a sufficient amount of overhang to lift the boat outward, from its position in the chocks, to clear the side of the vessel. Welin quadrant davits are made in several sizes to suit requirements, ranging from size "L," suitable for steam launches or other craft of from 4 to 7 tons in weight, down to size "T," of especially light built-up gear for use on torpedo boats or yachts. The heaviest life boat, equipped with the Welin quadrant davit, can be swung clear by two men in the remarkably short space of 20 seconds.

Axel Welin, the inventor of the quadrant davit, was born in Stockholm, Sweden, where he graduated in naval architecture and mechanical engineering at the Stockholm Technical College. During his recent visit to the United States Mr. Welin delivered several interesting lectures on the subject of his patent davit before various societies throughout the country, his paper on Appliances for Manipulating Life Boats on Seagoing Vessels, read before the Society of Naval Architects and Marine Engineers at New York, in November, having already appeared in the MARINE REVIEW.

The Coston Signal Co. is exhibiting a splendid assortment of signals for ship, coast and harbor use, consisting of code, distress, and other night signals. An interesting feature of the Coston exhibit is a water light for attachment to life buoys, so designed that by throwing the life buoy overboard the light becomes unsealed and ignites instantaneously, guiding the man overboard to the buoy and the helmsman in the life boat in the work of rescue. Breaking seas or spray cannot extinguish this light, nor yet the strongest wind. The light has a capacity of about 300-candlepower, and is designed to burn one hour. These light-equipped buoys are distributed around the railing on the deck of passenger and other vessels, much the same as the ordinary life buoy, and are always ready for instant use. It has been found in actual test that these water lights can be distinguished plainly for a distance of from 15 to 18 miles.

COSTON LIGHT BUOY.

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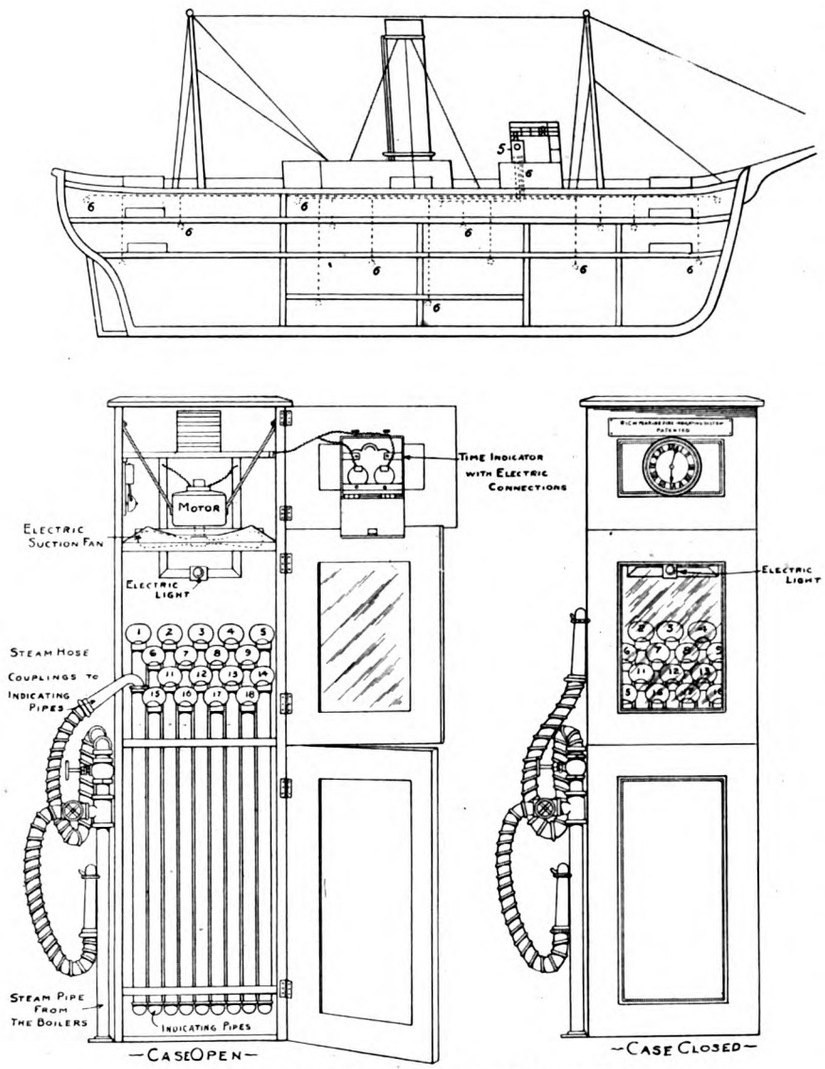


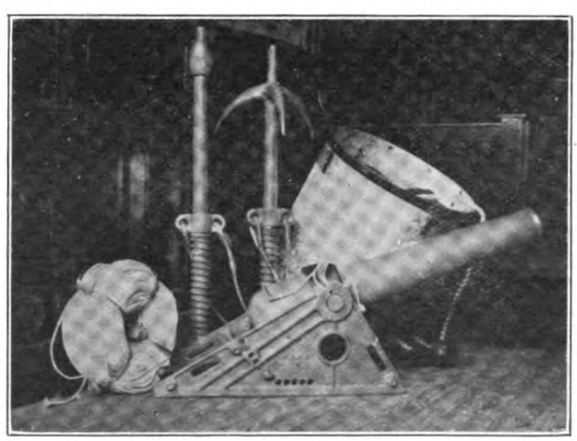
RICH FIRE INDICATING AND EXTINGUISHING SYSTEM.

Coston signals have been prominently identified with the efficient work of the life saving service since 1873, the time of their adoption, the first lives saved by the use of these signals being the crew of the Monitor, which foundered off Cape Hatteras in 1863. On that occasion the entire crew of the Monitor was saved by means of Coston signals conveying to the officers of the steamer Rhode Island the intelligence that the Monitor was in distress. Coston signals have figured prominently in the saving of life at sea and along the coasts for the past 50 years, and are known throughout the ports of the world.

The marine fire indicating and extinguishing system of William Rich, of New York, forms one of the finest exhibits in the hall, and can be seen in operation by those interested in methods of discovering, locating, and extinguishing accidental fires aboard ship. As will be seen on referring to the drawings, a station case is placed in any convenient part of the ship, preferably in the chart room or wheel house. Galvanized iron pipes are drawn from each hold or bunker, or other inaccessible compartment where fire protection is deemed necessary, into this station case, the lower end of each pipe being provided with an end-bonnet-shaped smoke receiver of about 8 in. diameter. A clock, located in front of the upper section of the station case, is set to keep regular time, so that every 15, 30 or 60 minutes, in accordance with the time desired, electric contact will be made and a current operate a motor-driven fan placed in the upper part of the station case. This fan forces the air out of the top of the station case and, accordingly, draws air through the pipes from the several holds and bunkers with which the station case is connected. If there should happen to be a fire in any one of these holds or compartments smoke will issue from that particular pipe. A flexible steam hose attached to a stand pipe, and being part of the extinguishing apparatus, can be coupled on to the smoking pipe, and steam turned on at a valve on the stand pipe. The steam flows down to the compartment and smothers the fire in its incipiency. The system can be operated by either the ship's dynamo or battery power, and works entirely on automatic principles.

The demonstration of the Rich marine fire indicating and extinguishing system is intensely interesting, but, what is more eloquent than the words of the inventor or demonstrator in stating the value of the system aboard ship is framed copies of letters from not only the owners and superintendents of shipping companies but the deck and engine room officers, the men who have seen the system in operation when fighting fire below decks. Silent but impressive testimony.

An apparatus is exhibited by the Meyers-Rogers Projectile Co., of Seattle, with offices at New York, by which communication may be established between a stranded or wrecked vessel and the shore, and passengers and crew landed by the breeches buoy apparatus without any assistance



THE MEYERS-ROGERS PROJECTILE.

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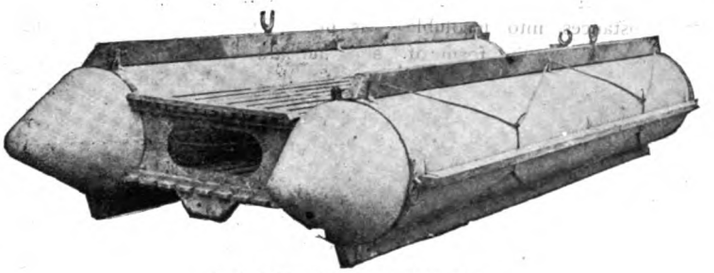
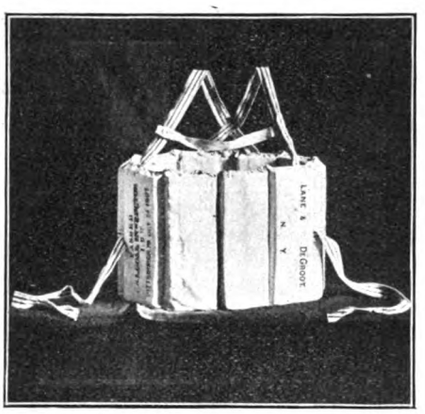


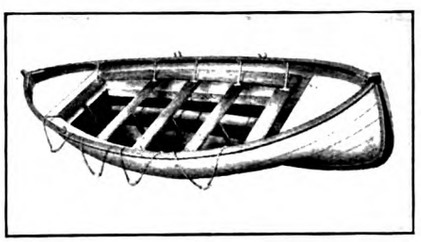
METALLIC CYLINDER LIFE RAFT.

from those on shore. This apparatus consists of a gun firing a projectile arranged to carry a 2-in. manila rope a radius of ¼ mile. The projectile, the end of which is a grapnel, is equipped with a heavy spring attached to a sliding ring, this ring being part of the cable carrying fittings. With this design sudden shocks to the cable, and the accompanying breakage, are prevented. When discharged shoreward the projectile automatically anchors, and the work of rigging the breeches buoy can immediately be proceeded with. The rope, which is strong enough to bear the weight of several men, is attached to a high and safe part of the upper works of the vessel. The first man to go ashore on the breeches buoy carries a line by which the breeches buoy can be operated in the work of rescuing the remainder of the crew and passengers, this line being arranged in endless whip form. The rope is coiled into a tank or drum and is arranged to move freely when the apparatus is in operation. The old style apparatus now in general use calls for the presence of an individual on shore to receive the light line attached to the weight.



THE LANE & DEGROOT LIFE BELT.

The gun firing the Meyers-Rogers projectile is of forged steel, and has a margin of safety of 125,000 at the breach, where the metal is 2 in. in thickness. The apparatus weighs only 20 lbs. more than its old-fashioned predecessor, the great saving in weight being due to the use of only one whip line and the 2-in. rope, replacing the three small lines and one 3-in. rope of the gun now in use. The value of such apparatus as part of the equipment of a vessel cannot be overestimated, especially on coasting vessels and those in the great lakes trade. The disasters of the passing winter season along our coasts should direct general attention to this improved breeches buoy apparatus, the equipment of which might have been the means of saving some of the many lives lost on wrecked and stranded vessels.



METALLIC LIFE BOAT.

Models of metallic life-boats and rafts are exhibited by the Lane & De Groot Co. of New York, also a model of the collapsible, unsinkable, self-bailing life-boats made by this firm. The metallic life-boats made by the Lane & De Groot Co. for general use are constructed of No. 18 B. W. gage galvanized iron, in sizes up to 20 feet in length, and of proportionally thicker material in boats from 22 feet in length up. Countersunk tinned rivets, staggered, are used in the construction of the hull, all seams being caulked with cotton. This life-boat is approved and recommended by the board of supervising inspectors of steam vessels, as is also the metallic cylinder life-raft. These life-rafts are built of heavy galvanized iron cylinders, divided into air tight compartments by iron bulkheads, and are designed in various sizes from a capacity of 28 persons down to 7. The Engelhardt collapsible life-boat is designed to enable a passenger steamer to carry life-boats sufficient to accommodate all on board without crowding, three of these life-boats, nested, occupying the same space as one ordinary life-boat, under one set of davits. This company also has an interesting display of life-preservers, the exhibit including life-buoys, belts and a chair-buoy. This chair-buoy resembles certain types of life-buoys used aboardship, but has in addition a network chair wherein the person is seated. With this exhibit is a model of a large life-boat equipped with working models of the Welin davit.

LIFE BUOY EXHIBIT.

COLLAPSIBLE LIFE BOAT EXTENDED.

Engineers will be interested in an exhibit of defective boiler parts, including burst tubes of defective manufacture, tubes burst through becoming weakened by corrosion and pitting and tubes found defective by inspection. There are numerous types of flawed and cracked boiler plating, and rivets eaten away by corrosion and other action. There are also some interesting and appalling exhibits of boiler scale and other deposits. Needless to mention, the fusible plug is occupying a prominent place in this exhibit. Exhibits of de-

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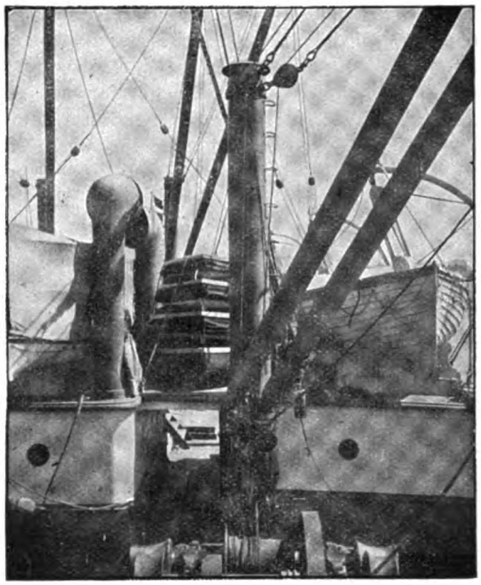
fective elevator gear, machinery, chains and cables help to make the exposition most interesting.



METHOD OF NESTING COLLAPSIBLE LIFE BOATS ABOARDSHIP.

The exposition of safety devices will be open to the public during the month of May, admission free.

BOILER SCALE AND ITS PREVENTION.

It is seldom that information regarding the cause and formation of boiler scale, its effects and the best means of its prevention are more clearly presented than in the following extract from a report rendered some time since by Arthur D. Little, chemist, of Boston, to one of his clients:

"All waters, especially surface water, contain more or less mineral matter in solution which remains in the boiler as an encrustation when the water is boiled away or converted into steam. The mineral ingredients most commonly found in water and which cause the formation of boiler scale are the salts of calcium and magnesium. When the water is converted into steam these substances gradually separate out from the solution in the form of deposits and coat the inner surface of the boiler with scale.

"Scale formation in detrimental in several ways. It is a non-conductor of heat and the fires must, therefore, be driven harder to accomplish the same results. The water becomes separated from the boiler plates and these latter become overheated and are gradually burned out. The tubes and feed pipes of the boiler become more or less clogged and consequently become less efficient. Some of the scale-forming ingredients, especially magnesium chloride, also exert a corrosive action upon the iron.

"The aim of a boiler compound is to convert these substances into insoluble compounds which settle in the form of sludge or mud and can be removed from the boiler by blowing or washing.

"We could prepare a list of nearly 200 materials which are known to have been used for boiler cleaning purposes, but there are only four of these which are worthy of mention. They are:

Soda ash, or sodium carbonate.
Caustic soda.
Tannin.
Kerosene.

"Soda ash is an alkali and will neutralize any acid in the water, and also precipitate salts of lime, magnesia, iron and alumina, in the form of soft sludge which can be easily removed when the boiler is cleaned.

"Caustic soda is also an alkali and neutralizes acids and aids in the precipitation of the various salts.

"Kerosene is used in connection with the above to prevent foaming or priming.

"Tannin is also used to prevent foaming or priming, and will precipitate certain mineral matters, although it is not so efficient in this respect as soda ash or caustic soda."

The intelligent purchase of oil presents a different problem, one that demands the knowledge of the expert for the correct solution. Large buyers are more and more basing their orders upon technical determinations of the recognized constants by which the value of an oil may be determined.

The following practical case is suggestive of the possible savings attainable through such methods. The management of a combination of mills called in a chemist to collect samples from the various plants, to determine their constants and indicate opportunities for decreasing the expenditures. In his report (from which with obvious substitution of designating letters for the exact names of the oils) the chemist, Arthur D. Little, of Boston, tabulates the cylinder oils as follows:

Designation.	Price.	Sp. Gr.	Flash.	Fire.	Cold Test.
A	51c	0.898	520	613	48
B	51c	0.903	523	621	48
C	38c	0.887	541	617	52
D	46c	0.899	500	590	45
E	38c	0.886	500	572	41
F	38c	0.883	511	555	30

Attention is called to the range in price which is much greater than the actual difference in the oils themselves. Although the constants for A, B and C are very nearly alike there is a difference of 13 cents per gallon in the price. The other samples are manifestly inferior, but all were straight petroleum products containing no acid. In contrast Mr. Little gives in his report the following constants of a cylinder oil which is being generally and satisfactorily used by some of the largest concerns in the country on similar service.

Sp. Gr 0.890
Flash ..... 533 degrees F.
Fire ..... 610 degrees F.
Cold ..... 37 degrees F.

This he asserts is also a straight petroleum product free from acid, but it costs only 20 cents per gallon. Based upon the substitution of this oil for the various kinds used in the different mills covered by the report, Mr. Little shows his client a possible saving of nearly $1,000 per year on the item of cylinder oil alone.

The E. N. Carr Pump Governor Co., Newcastle, Ind., has just issued two little folders, one descriptive of the Carr oil pump governor and the other of the Carr steam pump governor. The circular represents that the oil pump governor is a great oil saver and is guaranteed to pay for itself in a short time. Directions are given in the circular for its installation. The steam pump governor is represented as being the best in the world for waterworks pumps and air compressors. It will maintain a uniform water pressure on the discharge pipe or mains so long as the consumption is within the capacity of the pump and can be adjusted to any desired pressure by turning the regulating wheel to the right or to the left.

Captain James Richardson, one of the best-known mariners on Lake Ontario and for 20 years in the employ of the Niagara Navigation Co., died recently at St. Michael's Hospital,

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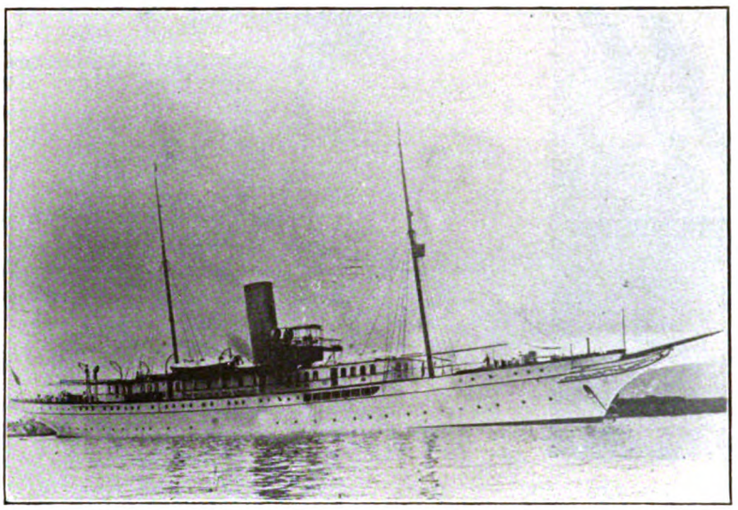
STEAM YACHT LIBERTY.

The steam yacht Liberty of 1,600 tons has been built by Messrs. Ramage & Ferguson, Ltd., Leith, Scotland, for Joseph Pulitzer, of the "New York World," from designs by Messrs. G. L. Watson & Co., Glasgow, who have also carefully superintended her construction in every detail. The Liberty was launched on Dec. 5. Mr. Pulitzer's yachting connection has extended over a number of years, though he has not before possessed any large vessel. Last year he chartered for six months Baron De Forest's 1,000 tons steam yacht Honor, which was also built at Leith from Messrs. Watson's designs, and so well was he peased with that vessel that he determined to have a yacht of his own, but one of larger dimensions. So he commisioned the same designers and builders to do the work for him; and before his charter had expired the new yacht was under way. As was natural under the circumstances, the Honor was taken as a basis, and to outward appearance the new vessel has a strong resemblance to her. But she is also a decided advance, and there are many points in which she shows a decided improvement.



STEAM YACHT LIBERTY, OWNED BY MR. JOSEPH PULITZER.

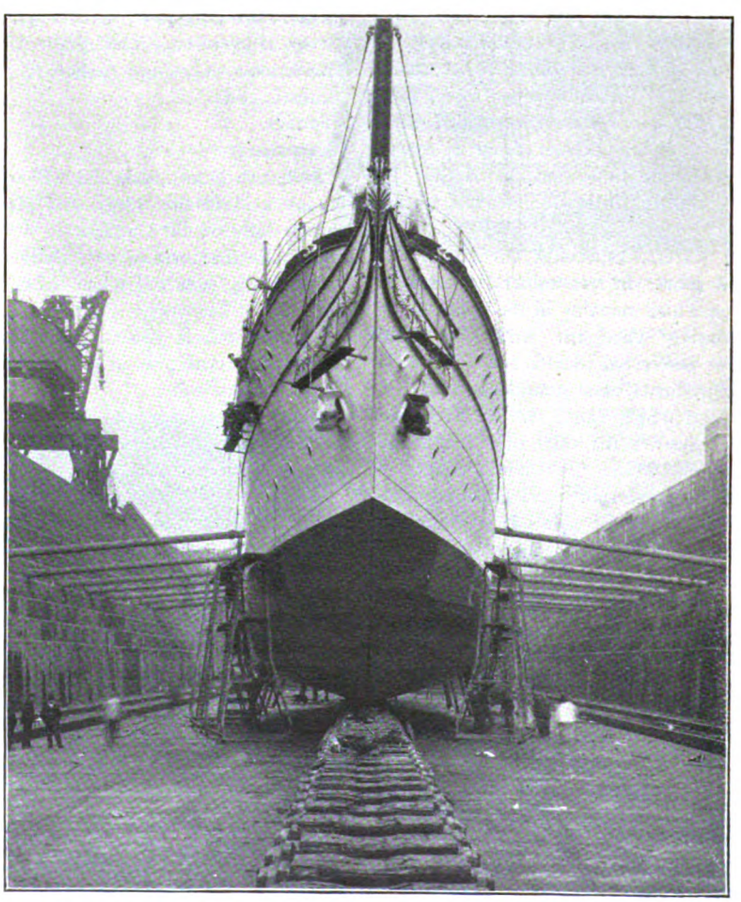
The Liberty is schooner rigged with two pole masts, and large smoke stack, clipper bow with scroll head, and an elliptical stern, which seems to suit this type of vessel best. She is practically a three-deck vessel, though there is a short break forward, which, however, is scarcely observable to a casual observer. On the top deck she has a long unbroken range of steel deckhouses amidships, with chart room and flying double bridge above.

The accommodation has been carried out entirely to Mr. Pulitzer's own ideas, and in this respect is something quite different from other pleasure vessels of her size.

The part of the yacht forward of the machinery space is entirely devoted to the owner's own private quarters and store rooms—all the guests' rooms, and the servants, officers and crew being aft. This ensures entire privacy for the owner, and all the bulkheads have been specialy deafened to eliminate noises due to the engine, etc., and so add greatly to the owner's comfort.

To get forward when necessary, the crew need not come on deck at all during the night—for a special passage way has been arranged on the port side of the lower deck leading from their quarters aft to the store rooms, etc., forward, and by a stairway they get to the forecastle deck.

In the range of deckhouses on the upper deck, commencing forward is Mr. Pulitzer's own study with lavatory and private vestibule adjoining, then there is the dining room, a very large apartment in oak, from which an oak corridor runs aft on the starboard side to the drawing room, which is aft of the machinery. On the port side there is a passageway leading from the dining room to the main pantry, which is placed in the casings. The drawing room is finished in white, with panels of silk on the walls. A smoking room in darker oak is placed aft of the drawing room, and at the aft end of this room there are double doors



BOW VIEW OF STEAM YACHT LIBERTY TAKEN ON DEC. 7, LAST.

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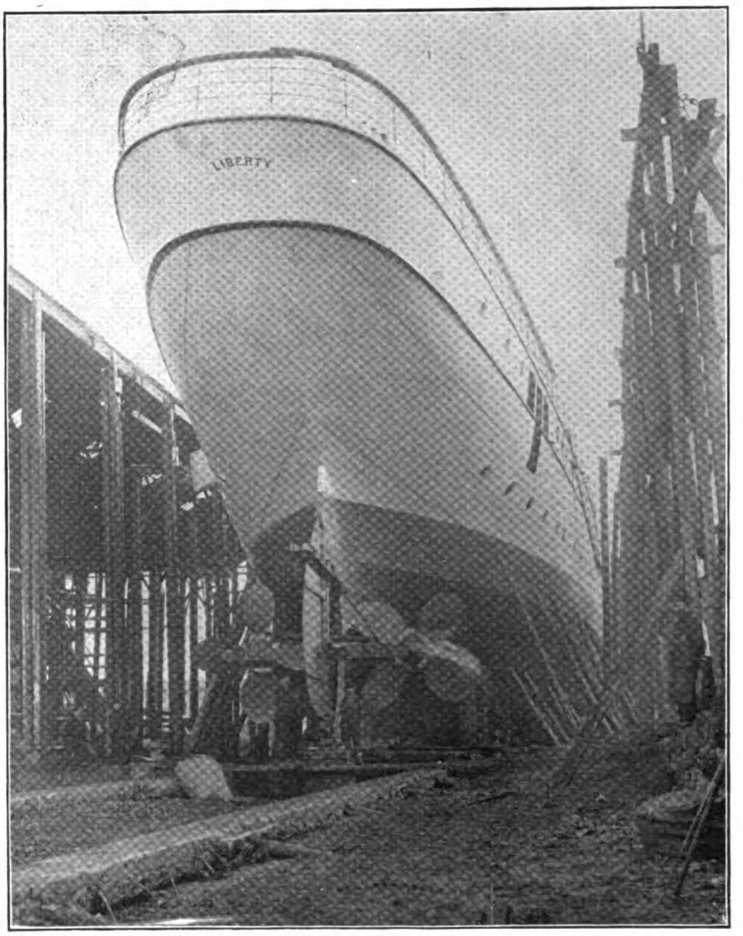
which can be thrown open to a fine deck shelter which forms the aft end of the deckhouses. All these rooms have been specially designed by Mr. Murray, London, and executed by Messrs. Wylie & Lockhead, Ltd., Glasgow.

On the main deck, as already mentioned, the owner's rooms are forward. These are reached by a comfortable stairway from his private vestibule in the deckhouse. There is a large bedroom, and also a sitting room, bathroom, etc., etc. The windows to these rooms look out over the break deck, the side walls being kept in from the side of the vessel a few feet, though the deck above extends out to the side. This affords protection, while giving ample light and air. Below these rooms on the lower deck there is another very large room, bathroom, clothes room, etc., etc., and then forward of these there is a gymnasium or exercise room fitted up with the best apparatus for getting exercise at sea. This gymnasium is a large room, and has great height, extending right up from the lower deck to the break deck, with large skylight on top. There is a spray bath, etc., etc., attached. There is a passageway on the lower deck starboard side to allow the guests to enter the gymnasium. The part of the vessel forward of the gymnasium is occupied by the chain lockers, store rooms, a hospital with lavatory attached, lamp room and other offices.

On the main deck on the starboard side of the engine and boiler casings there are six guests' rooms with bathrooms, etc. These are intended for bachelors. Aft of the casings there are six fine large staterooms, with bathrooms, etc., and a boudoir. All these cabins are very well lit and ventilated. On the port side of the casings there are servants' rooms, with large sitting room, cold larder, scullery, etc., etc., and also the captain's room. The main galley is placed in the casings.



STERN VIEW OF STEAM YACHT LIBERTY TAKEN ON DEC. 7, LAST.

The crew's quarters are all aft occupying the whole of the lower deck aft of the machinery and that part of the main deck which is aft of the guests' quarters. There is a large open space on the main deck for the use of the crew, and aft of this there is their galley, wash places and bathrooms. On the lower deck the extreme aft end is occupied by the firemen. Forward of them the seamen are berthed on the port side, and the officers on the starboard side. In the holds there are ample store rooms, those forward being reached by a trunk hatch from deck as well as by an internal stairway for the steward. The cold rooms for owner and crew are very ample, a powerful refrigerating plant being installed.

The Liberty carries four boats and two steam launches, all berthed on skids above the upper deck, in fact, almost like a boat deck. From here the sails, etc., are worked, so that the upper deck is left quite free as a promenade.

Her machinery consists of two sets of triple expansion engines, cylinders, high pressure, 16 in.; medium pressure, 26 in.; low pressure, 42 in. by 24 in. stroke. The propellers are of bronze, and are of different pitch so as to reduce vibration to a minimum. She has two cylindrical return tube boilers of the Scotch type. These are of different sizes—the large one being ample to supply steam for cruising speeds—the small one suitable for use in port and for short runs at moderate speed. While there is no extravagance whatever, all the latest improvements in auxiliary and deck machinery have been adopted. There is a powerful refrigerating plant, two large and independent sets of electric engines, also a storage battery. She has a steam windlass on the forecastle deck, with a powerful steam capstan forward of this. The anchors are stockless, stowing in the hawse pipes. Underneath on the main deck there is an electric capstan for working a kedge anchor, and there are separate hawse pipes for this purpose. Aft on the main deck is the steam steering engine, controlled from the flying bridge, and there is hand gear on the upper deck immediately above the steering gear. On the upper deck right aft there is a steam warping capstan. In the casings amidships there is an electrically driven boat hoisting engine with capstan heads each side so that all boats may be easily and rapidly handled. The vessel is heated throughout by the most approved method of hot water.

On Friday, Jan. 31, Liberty went out on her first steam trials, and though the weather was anything but

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pleasant, her behavior was entirely satisfactory to all concerned.

There was a stiff northwesterly wind blowing all day approaching a gale in strength, and this afforded an excellent opportunity for testing the yacht's behavior at sea. The result was that she proved herself an excellent seaboat, easy and comfortable in motion, and the impression formed from an inspection of the vessel before she was launched was confirmed, namely, that she will also be a dry boat.

On the measured mile at Gullane, where there was a considerable sea, she had a few progressive runs, and a mean speed of 15¼ knots was easily obtained. The boilers gave ample steam, so there was no difficulty in maintaining this speed, which is considerably over the contract guarantee. A five hours' continuous run was then undertaken at a cruising speed of 12 knots per hour, and during this run the auxiliary machinery was put through exhaustive tests with successful results. During the whole day the machinery gave excellent results without any hitch, notwithstanding the fact that this was the first run the machinery had. One remarkable feature of the day's trials was an almost total absence of vibration even at the highest speed, which is particularly gratifying to all concerned.

The Liberty has been specially designed for ocean cruising, and she promises to be particularly well adapted for that purpose. She has very large bunkers, so that she can carry sufficient coal to allow her to cross the Atlantic and back again without coaling. For the same reason, she has very large storage tanks for fresh water, besides having evaporating and distilling apparatus.

In several features it is evident that the designers have had to study utility as the chief object, certain peculiarities striking one as unusual. The Liberty is certainly a remarkable vessel, and should amply fulfill the purpose for which Mr. Pulitzer has had her built.

Jerry Meyer, J. McCarthy and James J. McCarthy have organized the firm of Jerry McCarthy & Son, ship chandlers, No. 157 Ohio street, Buffalo. They were formerly members of the firm of Connolly Bros., Michigan and Ohio streets, Buffalo. The McCarthys have had a long experience in the ship chandlery business and are well known to the vessel trade. Connolly Bros. will also continue in business.

"IN THE MERCHANT SERVICE"

When a man airs his views at some length on the matter of nerve and cool-headedness generally one naturally expects him, if occasion should arise, to show himself the possessor of at least the amount of nerve and the other ingredient in the make-up of the average individual. If the occasion does not arise, however, the expert on nerve, etc, goes through the world with a gradually-widening circle of nerve admirers, of which he, with his self-made reputation, is the center. And the world is full of them.

HE BOUNDED LIGHTLY ONTO THE HOSE.

Peters, of the Alroma, through application on his part, his various chief engineers' part, or other circumstances, had been shifted around the ships of the Blue Moon line more than any three engineers put together. He was tolerated by the superintending engineer, looked upon as of doubtful value by his various chiefs and other seniors, and by his brother engineers as one gigantic bluff, which is a sad reputation to have aboardship. He had been about a trip and a half aboard the Alroma when the little incident I am about to relate happened, but in that short space of time had managed to get himself disliked. Still, the other engineers considered life too short and the world aboardship too small for them to go out of their way to acquaint him with the fact. Hence he lived and had his being among them.

But it came to pass that on the evening of the little event some of the engineers had foregathered in the Third's room, discussing again the failure of the Third to land his first class "ticket" during his recent attempt in Liverpool. The Third, who had an enviable reputation as an engineer, had simply attributed his failure in getting "rattled" when undergoing the verbal examination on his fourth and last day before the board. He could have taken the examination again a week later, as is allowed in such cases, but had to rejoin his ship, which was in port on the evening in question. Peters, as usual, was holding forth, his remarks being listened to with patient resignation.

"It stands to reason," he said, "that when a man gets rattled during the examination he is hardly the person to be entrusted with a position calling for cool-headedness, presence of mind, and nerve combined. Without any offense to Smith, of course, I would say that a man who keeps his head before the examiners stands a better chance of pulling through than the man who seems to be well versed on the subject but in a chronic state of nervousness, even if the first man doesn't know too much."

"You must have been a regular icicle, so far as keeping cool was concerned, when you scrambled through for that Second's ticket of yours," commented one of the others.

"I was," said Peters, too full of ego to notice anything amiss with

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the remark, "why, the examiner complimented me particularly on that point. He told me I should waste no time in going up for my chief's after my year was in." And so on, and so forth.

It is strange, by the way, how many engineers there are handing out the same old tale as they journey through life. Or, if they do hold their chief's "ticket," have been strongly advised to try for their extra chief's, a position with the board of trade, or Lloyds, at least. It is a time-worn old gag that always comes up smiling and fresh, and we welcome it as an old friend. Mayhap we, ourselves, have worked it off on our trustful subordinates, who knows.

To return to the main point of the tale.

The dock of the Blue Moon line had as a near neighbor one of these nondescript wharfs that are seen sprinkled along our river and harbor fronts, a nondescript wharf to which nondescript craft with like cargoes attach themselves from time to time. They are the resting place of the harassed hobo and beach-comber, and, as is usual with the camping ground of these gentry, are by no means the spot the average individual would select to linger and ruminate. Occasionally the timber work and freight thereon gets wiped away in a cheerful little blaze, accidentally started by the gentry aforementioned. It was so the night of the discussion in the Third's room, and the Alroma lay about 200 feet from the blazing wharf.

As the fire department had arrived early on the scene they had the blaze well in hand, so no danger was anticipated from that direction on the steamer. As a precaution, however, the mate and engineer on night duty, with the assistance of the watchman, had laid a couple of hoses along the deck, and the fire pump down in the engine room was slowly passing water through them. The engineer on duty had passed along the quarters with the news that the wharf was on fire, thinking that by so doing he would have the pleasure of their company on deck for an hour or two, for it certainly is lonely on the long night watches, and he was not disappointed. They turned out to a man, with the exception of Peters, who was a heavy sleeper.

When the fire was practically out Peters' room mate, who was feeling a bit chilly, went down to the cabin for his coat. He had pulled it on and was leaving the room when Peters, eyes heavy with sleep, sat up in his bunk. He looked at the clock and stared in amazement.

"What's up?" he growled at the retreating form.

"Fire," said the other, as he trotted off along the alleyway.

"Fire!" Peters sprang from bed and his excitement increased as he noted the open doors and empty rooms. Why had nobody called him? All cleared out and left him—him, the best shipmate they ever had—to die like a rat in a hole. There was a slight film of smoke hanging in the air, and a smell of something burning. Good heaven—he might yet save himself. Before rushing from the room he glanced wildly about him. His drawers, with his watch, money and other trinkets, were locked, and he couldn't recollect in the frenzy of the moment where his keys were hidden. Anyhow, there was no time to lose. He had not noticed if all the other engineers were on deck and the bunks empty, and did not care. He had himself to look after.

Across the dock the fire was still smouldering but the excitement, so far as the men on the Alroma were concerned, was past. There was a general adjournment, as there were still a few hours for sleep. As they started aft along the main deck a figure, half clad and wholly wild, bounded from the door of the quarters right onto the wet and slippery hose lying on the deck. For a fraction of a second the figure poised, then crashed heavily down. It was Peters.

"What's the matter, Peters," called the Third.

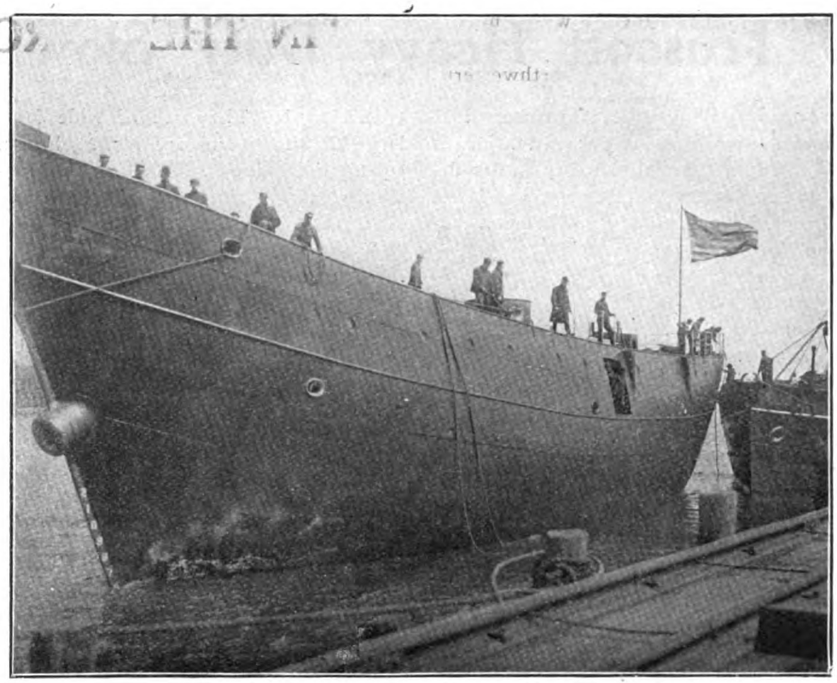
"You're too late," sang out the grinning mate.

"So I see," said the now thoroughly awakened Peters, as he carefully passed his hands along his wet and shivering form, feeling for the various points of injury. His eyes were fixed on the firemen toying with the hoses on the smouldering wharf as he did some rapid thinking. "I was just thinking of going over to lend them a hand," he added lamely.

"So we thought," said the Third, as he winked in the direction of Peters' bare feet, "they need nervy and cool-headed men over there."

"The darn fools that laid that hose along the deck ought to be shot," said Peters, for the want of a better remark. And they left him alone in his misery.

THE "STAND-BY" MAN.



LIGHTSHIP NO. 91.

LIGHTSHIP NO. 91.

The lightship No. 91 was launched from the yard of the Fore River Ship Building Co., Quincy, Mass., on April 16, the sponsor being Miss Frances Sanford Gregg, daughter of Tom H. Gregg, superintendent of construction for the lighthouse board. Light vessel No. 90 will be delivered in May.

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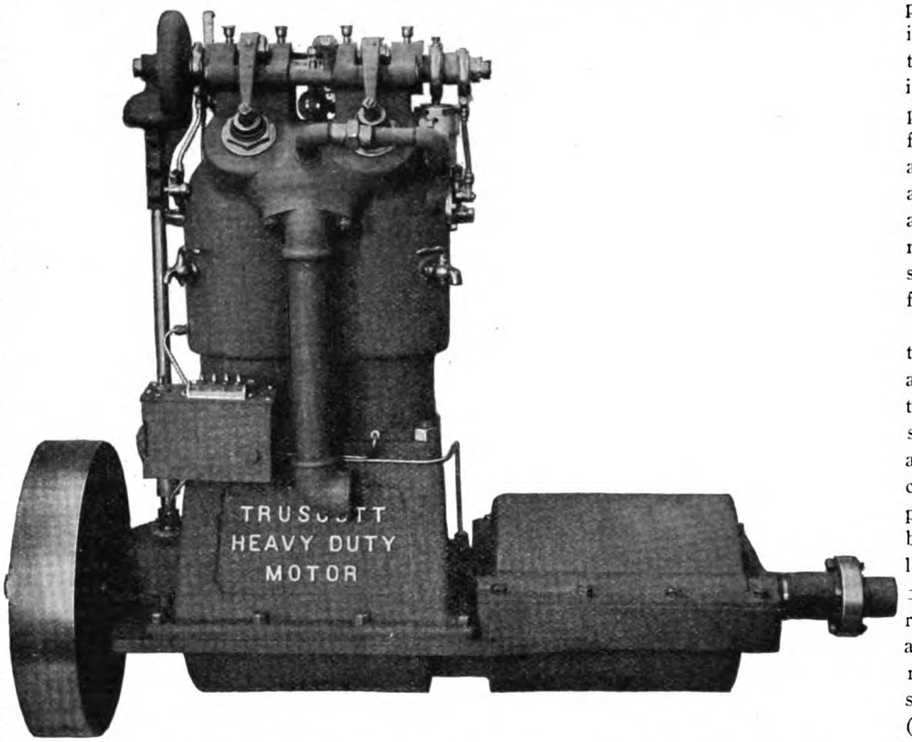
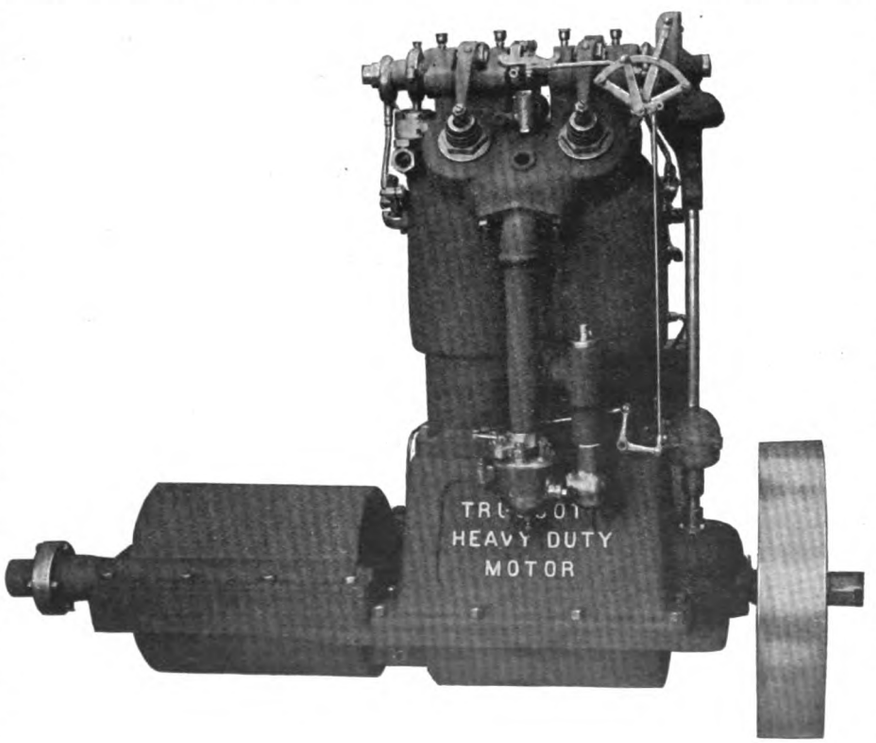
Truscott Heavy Duty Slow Speed Motors

In describing the Truscott 1908 model four-cycle motor, attention is directed to the individuality of its design, portraying, as it were, the latest accepted ideas of the efficient gasoline motor. It is admitted that a design which allows every atom of potential force to be directed above the driven member insures of decidedly greater power on a less consumption of fuel. Side-pockets in the explosion chamber must, therefore, be eliminated. This means that the valves admitting and exhausting the charge must open directly above the piston.



Various means of operating valves so placed are employed, but the Truscott plan is, due to its accessibility, considered the most acceptable. In this plan the cam shaft passes above the cylinders. It is supported by lengthy bearings, and from its cams the movement is imparted to the valves by rocker arms mounted in a way to permit of a direct pressure on the valve stems. The movement from the crank shaft is transmitted by a vertical shaft on the front of the motor. This shaft is gear driven, all gears enclosed and operating in an oil bath. The gears are of the finest quality carbon steel, having generated teeth. They are of wide face, large diameter, and are mounted in a substantial manner, dispelling the possibility of wearing out of alignment, and all tending to insure of the smooth and quiet running that all desire.



The connecting rod is of greater length than the average, meaning that the crank shaft receives the force of the impulse at a less angle of the pitman rod, tending to less vibration and to minimize wear on the parts directly affected. The base and base flanges are of good size, and the motor may be firmly secured to its foundation.

The accessibility of this design also appeals to the casual observer. The valves are placed in cages held into place by hexagon brass screw collars. This allows of removal for regrinding when, after considerable running, the valve seats begin to pit (which the exhaust valves of any four-cycle engine will do) without disturbing the main cylinder casting, and with no chance of stray emery falling into the cylinder and raising hob with the piston and cylinder walls.

The illustration shows the engineer in the act of removing the complete cage with valve; a slide holding the pin on which the rocker arm oscillates is lifted, the pin pulled out with the finger, the rocker arm lifted out of place, when the screw cap may be unscrewed with a wrench furnished for that purpose, and the valve lifted bodily. These valves are removed

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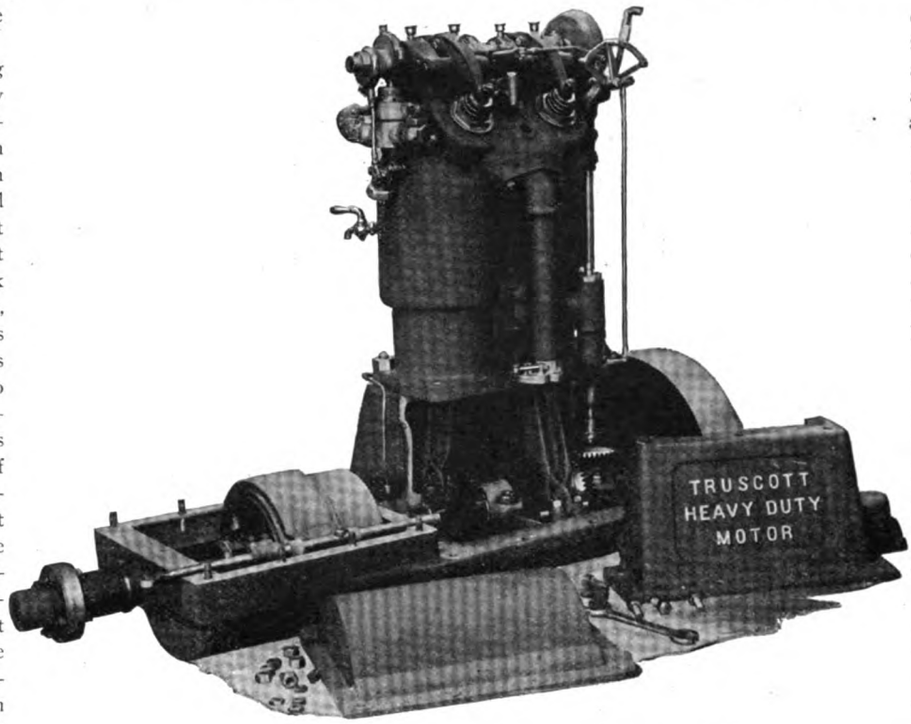
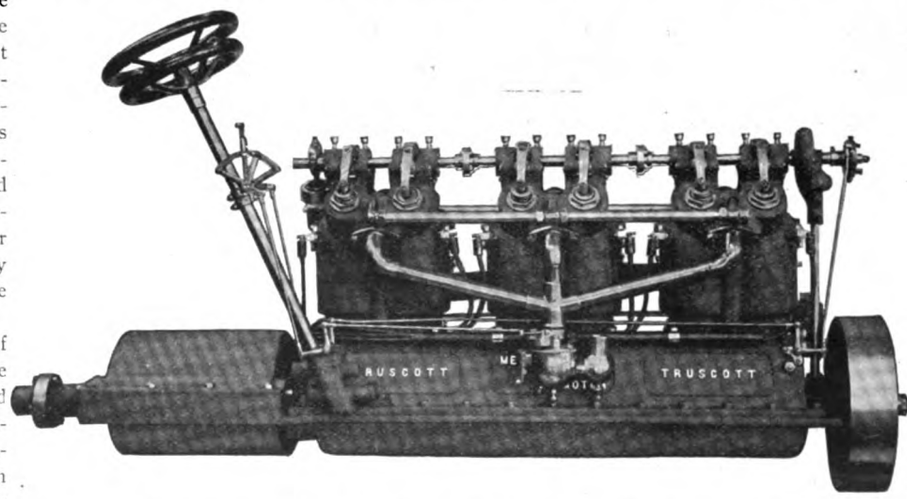
from their position, are replaced, with everything ready to run, in less than two minutes time. The construction permits of carrying a spare valve and cage to be inserted in place of a defective.

The circulating pump, contrary to the usual practice, is driven from the cam shaft. The speed of the cam shaft is one-half that of the crank shaft, meaning, therefore, less noise and less wear. The pump is of large capacity, and forces its full volume of cold water directly into that portion of the jacket immediately surrounding the exhaust valves and the explosion chamber. Its location makes it accessible for repacking.



The water jacket of the motor is of uniform width surrounding the entire explosion chamber. The valves are located to allow an equal water space around their entire circumference. A uniform expansion and contraction of the metal is the result, and the cylinder cannot become distorted. Distortion invariably results from an improper cooling and very quickly reduces the power of the motor by affecting the compression.

The upper half of the crank case is divided through the center. The cylinders are held on the one side by heavy studs, on the other by cap screws. The joints at top and bottom are ground to a perfect fit, no packing being used. This opening allows access to the crank pin, wrist pins, and main bearings, with an ordinary wrench, without moving the cylinders from their position or effecting a single adjustment. To gain access to this case, it is necessary only to remove the cap screws, bolting to the bed and the cylinders, separate the carburetor from the throttle, and slide the side out bodily, an act taking less than four minutes of time.



Thorough lubrication is and has always been a subject of extreme importance to the success and long life of the gasoline motor. The oiling system of the Truscott is well nigh perfect, belts, pulleys, uncertain pressure, and gravity have all be done away with, the oil being forced through a mechanical oiler gear driven. Ducts from this oiler lead to the pistons, crank cases and bearings of each cylinder. The sight feeds and adjusting screws regulating these feeds are mounted on top of the oil reservoir, in plain sight. The reservoir is of large capacity, and being practically automatic in its action, starting and stopping with the motor, it will require no thought until the supply is entirely exhausted. The crank case is kept filled to a level, whereby the splash of the connecting rods carries a surplus of oil to the interior moving parts, through special oil ducts and oil holes provided therefor. Rocker arms, cam shaft bearings and pump eccentrics are fitted with snap oilers, all having wicks, meaning cleanliness and infrequent attention.

The ignition is of either the make-and-break or jump spark type as preferred by the individual purchaser. In either event, the very best apparatus that the market offers is supplied, as the manufacturers realize the importance of high-grade appliances. The timing of the make-and-break ignition is effected by a rod passing through the cam shaft hollowed for that purpose, which acts on the various eccentrics that make and break the spark. The controling lever is mounted on a quadrant at the top and fore side of the forward cylinder. The throttle lever is mounted on the same quadrant. This quadrant may, if preferred, be placed in any part of the boat by passing connecting rods through the bilge, allowing thereby a one-man control, regardless of the size of the craft.

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A float feed carburetor is used, the warm air leading to the auxiliary intake being drawn from a special channel passing between the cylinder and leading to a warming plate at the exhaust pipe. This piping is arranged to allow regulation to secure the proper proportions of fresh and warmed air, all tending towards a mixture that will give the greatest possible force when exploded.

The purchaser has his option as to a reversing clutch or a reversing blade propeller wheel. The former is the more popular, especially on the larger sizes of motors, but the dependability placed on the reliable action of this clutch necessitates particular care in its design and manufacture. On the forward speed, an expansion ring on the Truscott clutch is interlocked with the clutch drum, giving a direct drive with no gears in action. On the reverse motion, the drum is held by a friction band, and gears are placed in motion. The gears are of cut steel, of good diameter and with exceptionally wide faces. The friction bands are wide and carefully fitted. The clutch is embedded into a permanent extension of the engine bed, is enclosed, running in a bath of oil, which, incidentally, excludes the possibility of damage from foreign substances. The reverse lever is located to suit the purchaser's requirements.

The material and workmanship entering into the construction of these motors are the very best that our experience, and the experience of others, have brought forth. Each part is made of material to do its respective work in a thoroughly dependable manner. The cylinders are bored to micrometer gage, and ground, with pistons also ground to fit. The main castings are of Superior charcoal iron. Crank shaft, connecting rods, and wrist pins are of steel forgings. The circulating pump and trimmings are of polished brass, the cam shaft and cams are cut from one piece of solid steel.

These motors are made medium duty and heavy duty types, with two, four and six cylinders, from 6 to 75 H. P. The medium duty is intended for general service, such as the pleasure boat, the speed boat, or the light cruiser. It is built just heavy enough to withstand the hard and continuous usage that this service exacts. The heavy duty type is decidedly slow speed, heavy, made for commercial service. It is large cylinder measurements of its rated horsepower, and throws a propeller wheel of large diameter and pitch.

The fittings applied are for either fresh or salt water, and the equipment is complete with all parts to allow of total installation, including gasoline tank, bronze propeller, and the Truscott system of submerged exhaust, which produces no back pressure.

The company refers to a goodly number of satisfied users of this type of motor, which is now entering its third successful season, and solicits correspondence from interested and intending purchasers.

SAWDOLET FLOORING.

C. Clemente, No. 1722 Oregon avenue, Cleveland, the inventor of the ship flooring known as Sawdolet,

MR. C. CLEMENTE.

which has been successfully installed on a number of lake ships, is now engaged in making decided improvements in the general color value of the composition. He has secured contracts to install the flooring on the bulk freighters John Dunn Jr., J. J. H. Brown and Wm. H. Truesdale, and the car ferry collier Marquette & Bessemer No. 2. Other contracts are pending both on the lakes and on the coast. This flooring will be installed upon the hospital ship now building for the department of Atlantic charities, New York City.

Sawdolet possesses numerous advantages as ship flooring, being monolithic in character and impervious to water, fire and dust. It possesses also the advantage of being easily and inexpensively cleaned. Stains in Sawdolet can be removed by lemon juice, the juice of four lemons being sufficient to clean 100 sq. ft.

THERMOSTATIC FIRE ALARM SYSTEM.

The Thermostatic fire alarm system invented by C. S. Bullock, which has been installed on the new steamer City of Cleveland, is meeting with great favor. It has recently been installed on the steamers C. W. Morse and Adirondack of the People's line. The new excursion steamer Americana, which is now building at the yard of the Buffalo Dry Dock Co. for the Crystal Beach run of the Lake Erie Excursion Co., will also be equipped with the Thermostatic system. In addition this steamer will have stations in various parts of the several decks from which an alarm of "Man Overboard" can be sent into the engine room, pilot house and crew's quarters. The City of Cleveland has a complete Thermostatic installation with 16 boxes in the engine room to register an alarm of fire. The annunciators used in Mr. Bullock's system are of the illuminating type. There are no troublesome drops, no arrows to stick, no magnets to gum up. Whenever the circuit is closed the current finds its way through the small incandescent lamp back of the stencilled section in the annunciator face locating the fire directly. On the Adirondack there are 24 stations, while on the Plymouth there are 40, not only locating the fire but indicating the nearest standpipe and hose connection. Connected with these annunciators there is a system of bells placed in the crew's quarters and all sleeping compartments below deck which is automatically cut in by a relay. As provision is made for sending in an alarm from any part of the ship by the use of a key, the captain can use this system for his weekly fire drills. The crew thus becomes accustomed not only to immediately respond to a call but to go directly to the parts of the ship where the danger is to be found.

Bids for more than $1,000,000 worth of improvements in the channels of Hay lake and the Middle Neebish were opened recently in the government engineer's office at Detroit. The work is in four sections and embraces a total dredging area of 300 ft. wide, 18,540 ft. long and 21 ft. deep. The lowest bidders on the various sections were: First, Charles Simons, Two Rivers, Wis., $81,950; second, Great Lakes Dredge & Dock Co., Chicago, $587,600; third, Zenith Dredging Co., Duluth, $175,107; fourth, Edwards Bros., Sault Ste. Marie, $624,690.

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BRITAIN'S ADVANCEMENT WITH LIQUID FUEL.

Within the last decade or so there has been some remarkable progress made in British industrial and marine enterprises in the use of oil fuel for a variety of purposes where coal was formerly used. And the most successful and economical of the installations so far tested in both private and government boilers is undoubtedly that of J. J. Kermode, consulting engineer of Liverpool, England, and known as Kermode's patent liquid fuel system. Mr. Kermode has for a great many years devoted all his energies to solving this very important problem of liquid fuel, and he has not only achieved well-merited success, but his system is now receiving world-wide recognition and adoption. The Kermode patent liquid fuel system gained the distinction of receiving the highest award at the Naval and Shipping Exhibition, London, in 1905. As will be well known to engineers, the great problem to be solved in burning liquid fuel is to find a suitable burner, and the illustration herewith shows the hot-air burner invented and now used in installations of Kermode's patent liquid fuel system.

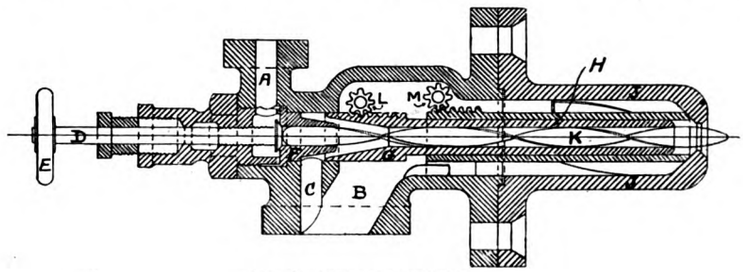

FIG. 1—HOT AIR BURNER.

In this burner the oil is partially vaporized and sprayed by means of hot air at a pressure of from ½ lb. to 4 lbs. pressure. Industrial furnaces will, in some cases, work satisfactorily with an air pressure of ½ lb., and in extreme cases, such as a marine boiler, 4 lbs. pressure will be required. The oil enters at the branch A, its further flow being regulated by a conical valve and seat; the air, heated by its passage through a suitable heater in the flues in the case of marine boilers, enters the burner at the branches B and C; the air passing through C meets the oil as it passes the oil-control valve, which is operated by the wheel E, and both travel on together, the oil being rapidly vaporized in its passage. There is a helix K in the central tube, which effects a complete commingling of the air and oil vapor will pass through the tube untreated. The supply of air can be regulated at two points by means of hand wheels, pinions, and racks; one pinion L moves the internal tube over the oil delivering nozzle F, and regulates the air which enters there. The second pinion, M, operates the outer tube, and varies the amount of air escaping around the mixed jet at the end of the twisted spindle K. All the elements of the combustion are under complete control. The oil, as it trickles from the nozzle beyond the valve, is swept forward by a sharp current of air, which envelopes the nozzle; this current can be regulated with great exactitude. A further compressed air supply is given where combustion is about to commence, while a third supply is caused by the induction of the flame or by the draft; this latter supply comes through the fire bars, and in special cases comes through a hollow furnace front, passing between the inner and outer plate, and escaping through a coned opening around the burner. No change in the arrangement of the furnace as designed for the use of coal is necessary, and to equip the furnace for burning liquid fuel it is only necessary to cover the fire bars with broken fire bricks to a depth of from 6 to 8 in., the greater depth being towards the bridge. The burners are arranged to hinge on the air and oil cocks, which are attached to the boiler, and if it is necessary to examine the front of the burners they can be withdrawn from the furnace, the act of withdrawal shutting off the supply of air and oil, and thus preventing an accident to a careless attendant. The hot-air burner is that which was so successful in the British Admiralty trials on H. M. torpedo-boat destroyer Surly. The burner is started by turning the pinion L until the inner tube is in the position shown in the illustration. The air compressor is then started, and air is blown slowly through the furnace, so as to ensure that no explosive gases are present. The burner is then swung back until the furnace door can be opened. A piece of oily cotton waste is then placed inside the furnace and lighted. The burner being in position, the oil is turned on, and the tube marked G is opened by turning the pinion L, and the air pumps are allowed to work slowly until the fuel is alight. The outer passage, which is controlled by the pinion M, is then opened until there is sufficient air to mix with the air and oil vapor coming from the tube H to cause complete combustion. The air supply can be easily controlled by the speed of the pump and by the proper management of the pinions L and M. It is claimed that these burners are equally suitable for light and heavy oils.

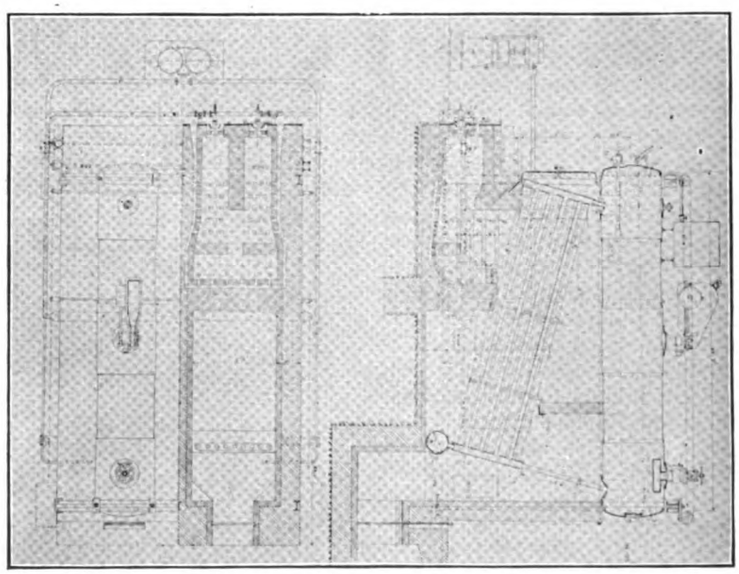

FIG. 2—HOT AIR JET SYSTEM FITTED AT THE TONLA BRASS ROLLING & CARTRIDGE FACTORY, ST. PETERSBURG, RUSSIA.

The following are particulars of some typical illustrations:

An installation of Kermode's liquid fuel system has been for nearly two years successfully at work applied to a boiler of the Babcock & Wilcox type at the Tonla Brass Rolling & Cartridge Works, at St. Petersburg. The installation was established subject to very severe conditions,

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a guarantee having to be given that the plant would have an efficiency of 78 per cent of the theoretical thermal value of the fuel used, which theoretical value was stated to be 19,400 B. T. U. per lb. of fuel. It was found that this could easily be done with an air pressure of only 7/10 of a pound per square inch. This result was regarded as extremely satisfactory, but it is important to add that the makers estimate that they can get an efficiency of as much as 83 per cent of the calorific value of the oil with a boiler of a similar type as that used at the Toula works. The combustion was said to be perfectly smokeless. The boilers were originally fitted with oil fuel burners of Russian manufacture, but Mr. Kermode guaranteed to exceed the work done with these by at least 10 per cent. This was accomplished. Fig. 2, of the engravings, shows a longitudinal vertical section and a half-sectional plan of the boiler at the Tonla works, and Fig. 3 a half-vertical transverse section and a section through the furnace at the same works.

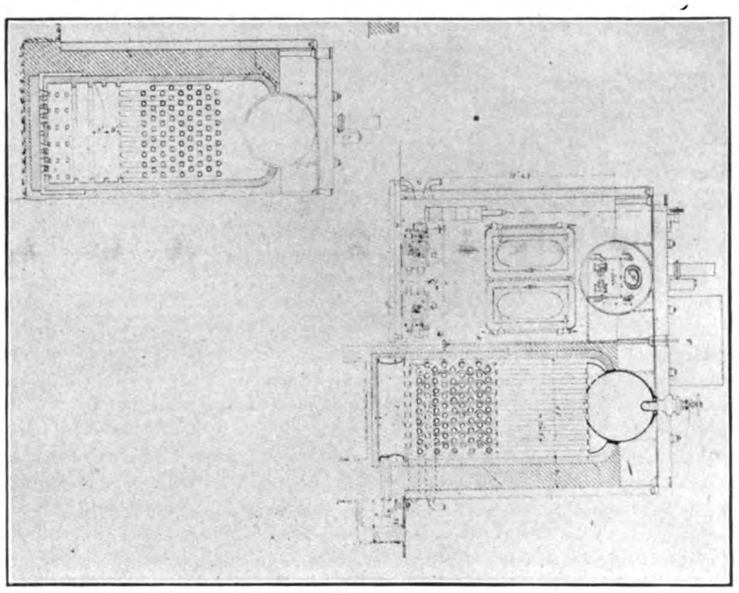

FIG. 3—HOT AIR JET SYSTEM FITTED AT THE TONLA BRASS ROLLING & CARTRIDGE FACTORY, ST. PETERSBURG, RUSSIA.

Hot-air, liquid-fuel system has also been fitted to the steamship Redang, of Copenhagen, under a 12 months' guarantee, and the vessel has now been running for five years. In this case the liquid fuel system works, it is stated, with an efficiency of about 80 per cent of the theoretical calorific value of the fuel used, that is to say, that if the calorific value of the oil fuel should equal 19,620 B. T. U. per pound, then the evaporation is at the rate of 16.31 lbs. of water per pound of oil consumed, the evaporation being from and at 212 degrees; or if the evaporation is from feed at 140 degrees to steam of 170 lbs., the result would be from 13.83 to 14.39 pounds of water per pound of oil fuel consumed according to the care used in the management of the fires, which require very little attention. The air pressure used for jetting never exceeds 3 lbs. per square inch, and excellent results can be obtained with less than 1 lb. air pressure. The flame is soft and regular, and no protecting brickwork is necessary in the furnace. No alteration to the ordinary arrangement which serves for coal firing is necessary, as the bars are simply covered with broken fire brick instead of coal, and this is raised to incandescence. A special arrangement of the furnace is adopted if oil fuel is to be solely used. The burners never choke and seldom require cleaning. They will use any kind of fuel, heavy or light (see Figs. 4 and 5). Figs. 6 and 7 show the general arrangement of the installation on the steamship Chancay, built by Messrs. Bow, McLachlan & Co., Paisley, and completed May, 1906. This is an outfit of Kermode's steam and inducing air burners. The basin horsepower trial of this vessel was so satisfactory, and the burners worked so easily and efficiently that a trial to collect data was not deemed necessary. and the ship was sent to sea after a successful trial trip. The vessel was built for the west coast of South America, where crude oil will be used for fuel. It is claimed that a boiler fitted with Kermode's burners can be forced 30 per cent beyond its normal working capacity without impairing the efficiency of the boiler. The liquid fuel for steamers is still in its infancy, but it is anticipated that great developments will take place in the near future. The introduction of oil fuel in the British navy makes for speed, and for a wider range of action. Its use will reduce the number of stokers, and these could be added to the fighting strength. It will lighten the task of stokers, it will remove the smoke column, which is so menacing a thing for a warship, and the fuel will keep without serious deterioration in any climate for an indefinite period. Ships may be bunkered at sea in heavy weather as easily as in a calm—a suitable hose connection between ships and the employment of a suitable steam-driven oil pump will do more work in one hour than the whole company of a battleship can accomplish, working their hardest, when taking in coal under the most favorable conditions either in dock or on the roadstead.

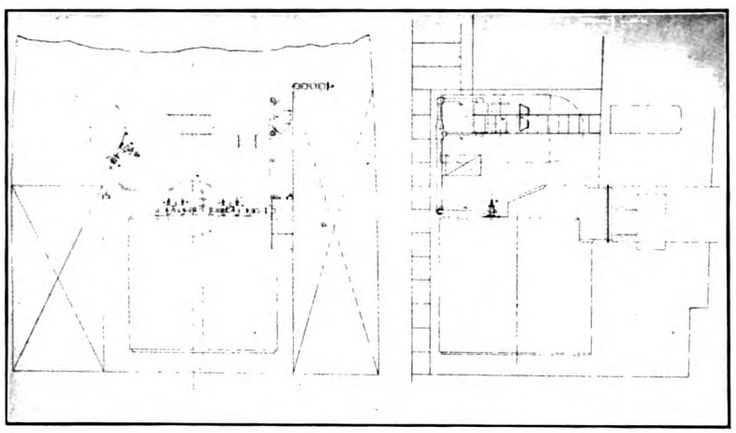

FIG. 4—HOT AIR JET SYSTEM FITTED TO THE STEAMSHIP REDANG OF COPENHAGEN.

The system can be fitted on water-tube and other boilers for steamers; the fire bars being retained as for coal, so that coal can be reverted to at any time,

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and without any trouble. A special system is designed for naval vessels, which is now being used by the British Admiralty.

It is significant that the British Admiralty received two reports prior to 1902, each report being unfavorable so far as the use of liquid fuel for the use of naval ships are concerned, but the Surly trials conducted by Mr. Kermode put the whole problem upon a sound working basis, and the latest British destroyers are all being arranged to use oil fuel solely. Liquid fuel may be put to various uses in ship building yards, such as the heating of plates, angles, rivets, forgings, brass and iron melting, and for repair work where plates, etc., are to be faired into place.

OIL FUEL FOR MARINE ENGINES.

Readers of the MARINE REVIEW, who have been following the recent trials by the British Admiralty of liquid fuel on warships, will be interested in the following observations of J. J. Kermode, Liverpool, England, the inventor of Kermode's patent liquid fuel system, who now

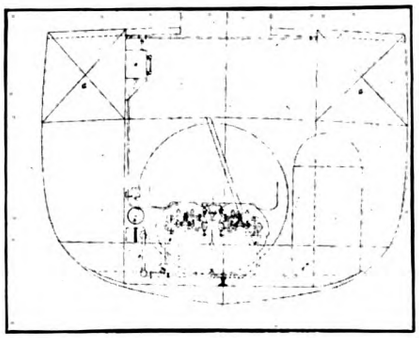

FIG. 5—HOT AIR JET SYSTEM FITTED TO THE STEAMER REDANG OF COPENHAGEN.

declares that the problem of the adoption of liquid fuel for the use of warships has been satisfactorily and completely solved, that is to say—full power can easily be obtained without smoke.

He claims that the range of action of a warship can be nearly doubled without altering her displacement if liquid fuel takes the place of coal and further that the fire-room personnel can be reduced by 80 per cent, and these could be added to the fighting strength. The ship can steam without showing smoke (a most important thing in war time), the boilers are always in a state of the highest possible efficiency on the furnace side, as there is neither soot or ash to reckon with, when it is considered that the full boiler power is always available for continuous full speed without the need for burning down and cleaning fires as in the case when coal is used and from this circumstance alone there is loss of power every four hours (at the change of the watch) when it is considered that the double bottom can be made available for the reception of liquid fuel, that the stoking is automatic, the ease with which oil fuel can be bunkered in port or at sea, its importance for naval needs should engage the serious attention of all naval boards. Mr. Kermode says:

"An extended series of tests for determining the relative value of coal and oil fuel for naval purposes were conducted and completed by the United States Naval Bureau of Steam Engineering during the incumbency of Rear Admiral George W. Melville as chief, and subsequently a most valuable report was prepared on the accession to office of Rear Admiral C. W. Rae, the present chief. This report, a copy of which was sent to me by the United States naval bureau, contains a great deal of valuable data, but it also shows that no one of the series of tests undertaken were conducted on proper lines and in some cases at least the several inventors or firms who were engaged to demonstrate the success of their various appliances and methods apparently lacked a full knowledge of naval needs. Few who are not actually engaged in naval engineering know the high performance which is exacted from a naval boiler and the lack of special knowledge and a special training in the handling of warship machinery no doubt contributed very much to the non-success of the several results obtained during the tests referred to.

"I have been actively engaged in naval construction the best part of my life and know the precise needs of every type of warship and it was left for me to solve this problem for the British Admiralty

FIG. 6—STEAM JET SYSTEM FITTED ON THE CHILIAN STEAMER CHAUNCEY, BUILT BY MESSRS. BOW, M'LACHLAN & CO., PAISLEY, SCOTLAND.

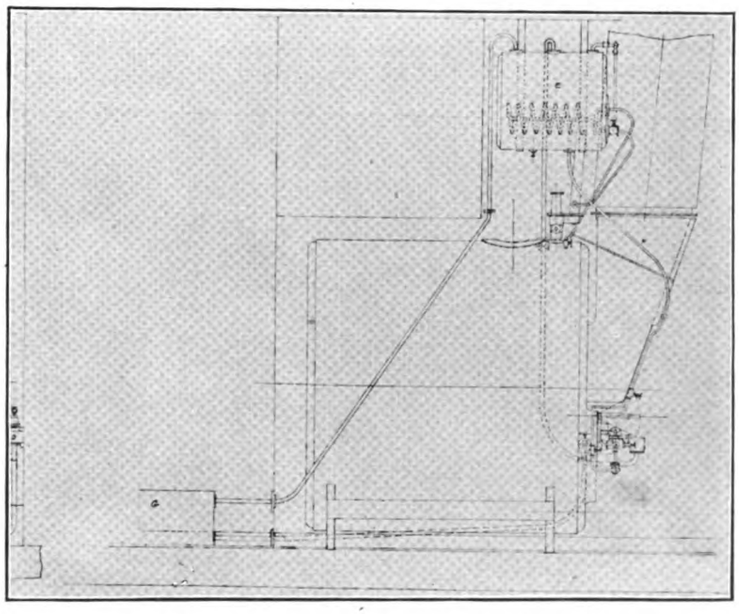

FIG. 7—STEAM JET SYSTEM FITTED TO STEAMER CHAUNCEY.

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with the result that all torpedo-boat destroyers now building, projected or recently put into commission are oil burners using the Kermode system.

"The importance of increasing the range of action of a torpedo boat or other war vessel and at the same time rendering the vessel difficult to detect by reason of smokeless combustion has determined the British Admiralty in favor of oil fuel and all vessels of whatever type will ultimately be arranged to burn oil fuel.

"The factor of cost of oil fuel has hitherto been a barrier to its adoption on this side for steam shipping and for a multitude of industrial purposes, and when the price of oil delivered in any port of the United Kingdom is such as to permit of its adoption there will be a considerable demand for the commodity.

"Twice prior to 1902 the responsible officials of the British Admiralty brought in adverse reports concerning the use of oil fuel for naval needs, and I think I am correct in stating that about the same time the same thing occurred in the United States.

"Up to 1902 not more than half power could be obtained on a British torpedo boat with oil fuel and even then this was attended with dense smoke and flame.

"During the series of tests which I conducted on behalf of my firm at the instance of the British Admiralty in the summer of 1902 we easily obtained perfect smokeless combustion and exceeded the full power by 15 per cent. This series of tests served to determine every factor which governs design, and the building and equipping of oil-fired warships is now a branch of British industry.

"On this side we are without oil wells, nevertheless the importance of oil fuel for naval needs is so fully recognized by the British Admiralty that it has an important and significant meaning in our building program.

"How much more important the question must be to a maritime nation possessing an important navy and at the same time possessing inexhaustive oil fields needs no comment.

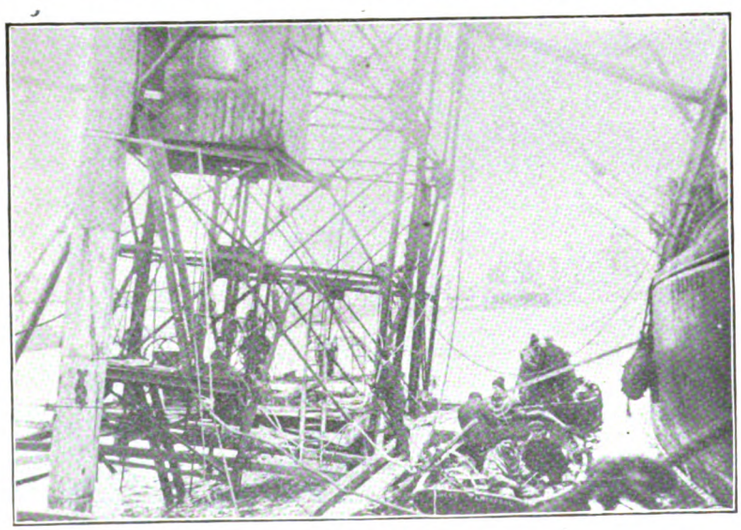
"A complete equipment for burning oil fuel on a warship would dissolve many difficulties. Instead of shoveling coals, men would simply govern the oil jets, the work would be easy for one man to attend to the needs for several thousand horsepower, the fires would be under perfect control, even steaming would be assured at all times, the efficiency of the boiler would not diminish throughout a long voyage, the fire room would be as clean as the engine room, the number of ships might be doubled or thereabout without adding a unit to the personnel. These are possibilities which the experts who attended the British naval tests conducted by me satisfied themselves as capable of realization.

"Weight for weight, oil fuel will accomplish fully 75 per cent more than coal, and a full head of steam can be generated on a destroyer in 12 minutes from the moment of lighting fires.

"The bunkering of a fleet expeditiously is a vital matter and it usually takes 35 men 2½ hours to put 80 tons of coal on board a steamer in a river or roadstead from lighters, whilst in the case of oil fuel, 300 tons can be put on board in one hour cleanly and silently by a steam pump. The initial difficulties have been overcome, and the future is pregnant with confidence. It is scarcely necessary for me to emphasize the importance of this subject to our American cousins."

Unique Salvage Job at Liverpool

One of the smartest feats ever performed by the Liverpool Salvage Association is that of raising the large 700-ton coal transporter, Pensarm, which had foundered in one of the Liverpool docks. This craft, which is worth about $30,000, presented with its great iron tower and its constructive peculiarites a serious prob'em to the salvors. The Pensarm itself is a huge craft with a deadweight of 700 tons, measuring 80 ft. in length, 35 ft. beam and a draft of 13 ft. She foundered in dock during a heavy gale while discharging coal from another steamer. To lift her the ordinary method of pumping after closing all apertures was not considered practicable, as the weight of water on the light iron decks was calculated to break them in. The only other alternative which Capt. Young, the chief wreck officer, advised was to build a cofferdam over the water level round the main hold, and then to pump the vessel until she righted herself. This task entailed expert diving and engineering work of a nature which has not been attempted since a similar operation performed on the Ithiopia, the Italian passenger ship, which some years ago, foundered in the Mediterranean on her outward voyage from Genoa to New York. Experts who witnessed the work are unanimous in expressing the opinion that a more perfect piece of cofferdam engineering has not hitherto been reported, and that the work done below water level by the divers was an eloquent testimony to the efficiency of the Liverpool Salvage Association. The dam itself was 15 ft. deep, 30 ft. wide, and 50 ft. long. The strength of its construction may be gathered from the fact that on each side it had to resist a water pressure of 400 tons. The building of the cofferdam was commenced by laying round the open part of the deck of the sunken vessel pitch pine logs fore and aft. Then three large logs of the same wood were bolted to these from the large iron tower above water, and in between these were built frames to support the powerful wooden shields which shut out the water. The shields



THE SUNKEN COLLIER PENSARM PREVIOUS TO BUILDING COFFERDAM.

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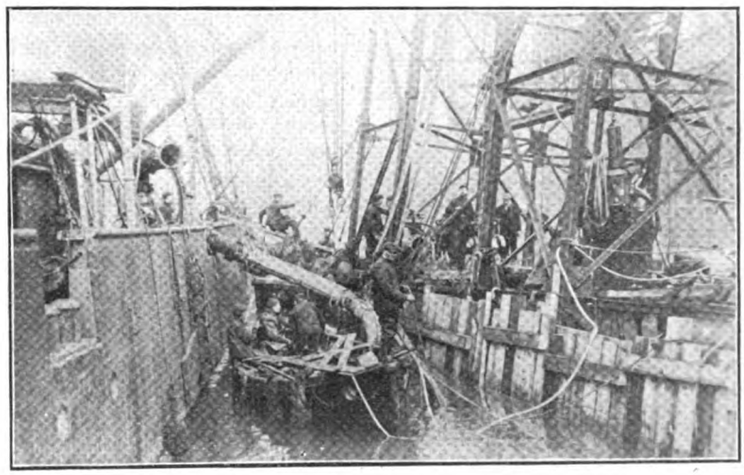
were made in sections ashore, and were floated to the wreck where they were lowered end down and bolted by divers. In this work pneumatic drills were used, and the laying and bolting of the shields and supports was done by the divers under trying conditions with an exactitude that was considered remarkable. For the purpose of pumping, two 12 in. pumps capable of lifting 800 tons of water each per hour were connected from the salvage steamer alongside, and a further 12 in. pump, worked by an oil motor, was fixed on the top of the dam. This latter apparatus is one with which the association has been experimenting for some time, and it has been found to be a valuable aid to salvage work. It is so portable that at the concluding stages of the operation it was found possible to sling it from the top platform on to the deck of the wreck, and in a very short time to put it into operation. These three pumps were so effective in their work and the cofferdam so free from leakages that in two hours after pumping operations had been commenced the vessel was completely raised. In engineering circles the feat of lifting the transporter in the manner described is regarded as a very praiseworthy feat, and it is interesting to recall the fact that Capt. Young, the chief wreck officer, for his skill in such work, was elected as a full member of the Institution of Mechanical Engineers, and is the only master mariner thus qualified.

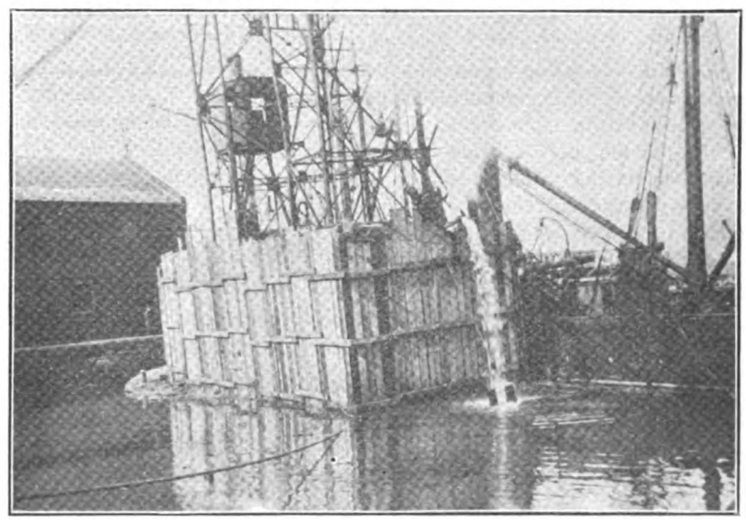


COLLIER PENSARM COFFERDAM FINISHED AND READY FOR RAISING.

The steamer E. F. Gould has been sold by John M. McKerchey to Capt. John D. Baker, of Detroit. Capt. Baker will install a derrick in her and use her as a wrecker.

AN INGENIOUS GRAIN ELEVATOR.

In the course of a few weeks there will be in actual work at the Liverpool docks one of the most useful and ingenious grain elevators that has been invented in recent years. It is the invention of J. T. Brown, an employe of the Mersey docks and harbor board, Liverpool, who has been closely connected with the handling of grain cargoes for upwards of 30 years. Mr. Brown claims that his invention is a distinct advance on present mechanical appliances for handling grain cargoes, and will reduce the cost by 25 to 30 per cent. No assistance is required from the gear of the steamer in discharging the grain, which is taken out of the vessel's hold by means of a chain of buckets, which carry it to a receiver along which it travels and is discharged into a hopper. From the hopper it is raised by a similar process to the top of the elevator, and is then conveyed by means of shoots into the warehouse or barge, or if required into sacks which are automatically weighed, counted, and landed on a platform ready for transhipping. When desired the grain can be screened on board the elevator barge, the dust and screenings being collected by a cyclone so that there is no wastage. In addition to bulk grain, provision is made for dealing with sack grain cargoes, which can be discharged, weighed in drafts of three or five bags, shipped into bulk, reweighed, and delivered either in sacks or bulk. The elevator barge which contains the motive power for, and the whole of the machinery necessary for these manifold operations, can proceed to any vessel in dock or in the river, and can deliver to steamer, sailing vessel, or barge, or to any warehouse having quay facilities, or on to carts or railway wagons, when rails are laid alongside the quay. One or more plants can be placed on the same barge, and the bulk handling capacity of each plant can be made as desired from 50 to 100 tons per hour.



RAISING THE COLLIER PENSARM, SHOWING THE COFFERDAM.

The portable elevators at present in use at the Liverpool docks are of a type introduced nearly 30 years ago, the machine being carried in the hold of a barge, and only being capable of discharging grain out of a vessel provided with a lifting boom or derrick. The Brown elevator, on the other hand, is distinct from the old system in three important particulars, it weighs the grain; it can dis-

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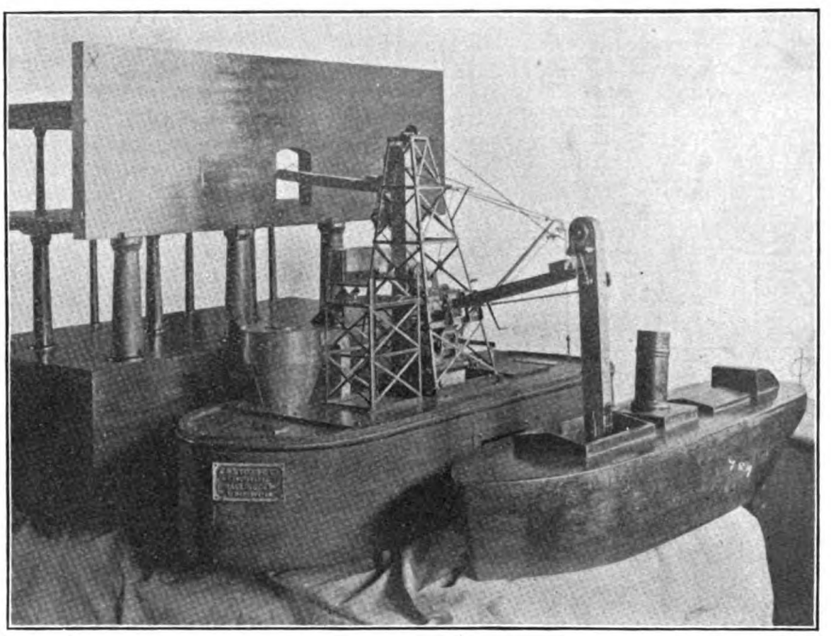
charge grain out of any ship or even a barge without the need for any appliances on board the vessel; and it can begin discharging at once when the grain is full up to the top of the coamings, no initial hand labor whatever being thus required. By this new apparatus the rate per ton for



BROWN'S COMPLETE GRAIN ELEVATOR.

discharging and delivering grain into the warehouses of the Liverpool docks will be reduced from 68 cents to 48 cents, or a saving of 20 cents per ton. Another saving brought about by the new apparatus refers to the delivery into railway wagons at the docks, the estimate being made that in connection with the receipt of the grain from Atlantic liners and its being handed over to the railway companies the cost would not exceed 30 cents per ton, a saving of 24 cents being attained. To sum up the many advantages that this invention has, it may be shortly stated than no ship's gear or assistance is required from the vessel to be discharged, the whole of the work of unloading and weighing being done by Brown's plant; that enormous economy in labor is produced in each of the operations to be gone through; that even grain cargoes in bags can be successfully dealt with by an ingenious adaptation of the Brown system, and by this means the sacks may be discharged and weighed or shipped into bulk as may be required. There are no complications whatever in the mechanism, and it will be found that the apparatus is not only a great advance on the existing system, but is in every way a complete and perfect grain elevator. The illustration shows a model of Brown's complete elevator and a model of a ship being discharged by the elevator into a section of the Wapping dock warehouses, where this new elevator is to be wholly employed. As before stated the patentee is J. T. Brown, and the invention is being put on the market by Brown's Complete Elevator Co. of Liverpool, which has just been formed.

ST. PAUL SINKS GLADIATOR.

The American liner St. Paul in a dense snow storm rammed the British cruiser Gladiator off the Isle of Wight, sinking her within a few minutes. The Gladiator was at anchor and was not seen until the liner was practically abreast of her. The St. Paul's sharp stem rammed the cruiser amidships and she began to sink at once. Her men gave a magnificent demonstration of discipline. At the captain's command they formed a line on deck while the cruiser settled down. In obedience to orders successive squads marched to the gangways and entered the St. Paul's boats which had been lowered until practically all were taken off and safely landed on the Isle of Wight. There were a few casualties, but the exact number is not yet known. The St. Paul returned to Southampton but her injuries are comparatively slight.

AUSTIN REVERSIBLE ROTARY ENGINE.

Editor MARINE REVIEW: The sinking on Saturday of the British cruiser Gladiator by the American liner St. Paul demonstrates anew the need of equipping large ships with instantly reversing engines. While the cabled reports do not give the time which elapsed from the order for "full speed astern," and the reversal of the ship's engines, yet marine engineers know the St. Paul's reciprocating engines took several minutes to do so. If she was proceeding at full speed, then from four to five minutes; if at half speed, then from one to two minutes elapsed between the signal to reverse and when the engines were going full speed astern. At such a time even two minutes seems an eternity for all concerned.

If, however, the St. Paul had been propelled by "Austin" instantly reversible rotary engines of, say, 5,000 H. P., 20 to 30 seconds would have sufficed to completely reverse her engines. This might have prevented the ramming of the Gladiator. To stop and reverse a ship's engines as can be done by the Austin in from one-tenth to one-twentieth of the time now required will largely reduce the possibility of marine disasters. In putting the time from full speed ahead to complete reversal at 20 to 30 seconds for a 5,000-H. P. engine, we are making an excessive allowance, as our present 50-H. P. engine is being reversed scores of times daily in from one to two seconds, and this without the slightest strain upon the engine.

Marine engineers are well aware of the danger of rapidly reversing reciprocating engines. Nothing but the imminence of great danger justifies an order for "full speed astern" when a modern leviathan is going at full speed, because of the possibility of blowing out cylinder heads, bending connecting rods, and completely deranging machinery which might take weeks to repair, even if no part breaks and endangers human lives around.

Fortunately for ocean travelers an engine now exists which can be instantly reversed with impunity without any effect on the engine. Its general adoption for marine purposes will mark another milestone in providing safeguards for human life at sea, thus tending to make men as safe on the ocean as at their own firesides.

It must be remembered that turbines will not reverse. Extra turbines must be provided for this. As it is usual for these reversing (surplus) turbines to be only half-power, it means

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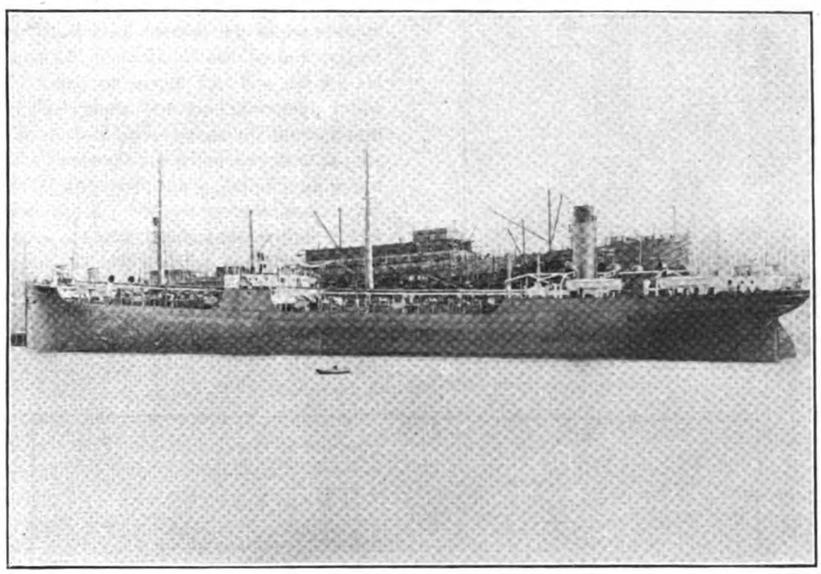
that when the need is most urgent for the greatest power, only half-power is available to avert a collision. Not merely can the Austin be reversed instantly, but by opening its by-passes thus making all its engines high pressure the torque can be increased four-fold, or an equivalent of eight times the power for reversing the ship's course as compared with what is possible with turbines, and this without carrying any surplus engines.

Yours very truly,

ROBT. BAKER,
President Austin Rotary Engine Co.

Brooklyn, N. Y., April 29. Second avenue and Eighth street.

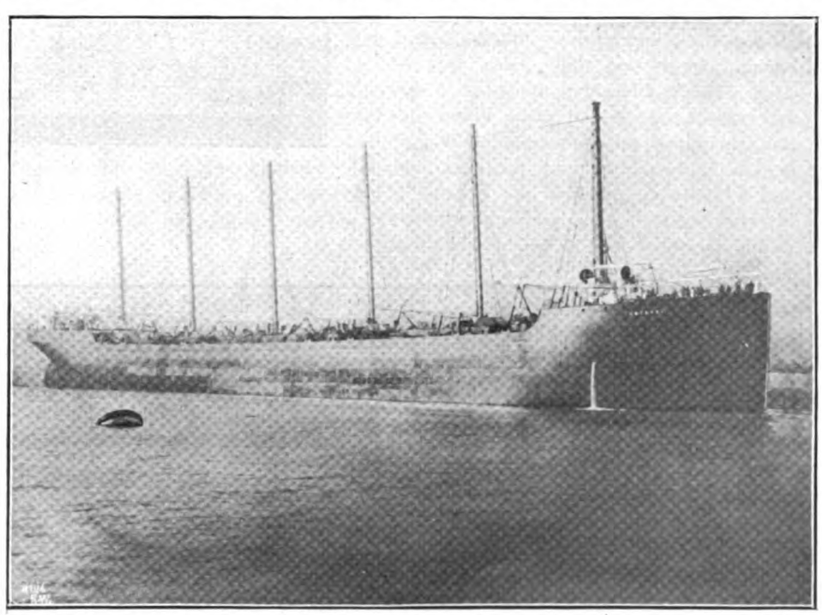


OIL TANK STEAMER IROQUOIS.

TWO LARGEST OIL-CARRYING VESSELS IN THE WORLD.

We are enabled by the courtesy of the Anglo-American Oil Co., to give the accompanying illustrations of the novel oil craft Iroquois and Navahoe which have been built for that company by Messrs. Harland & Wolff, Ltd., of Belfast. To describe the Iroquois first, it may be at once said that this vessel has many interesting features, amongst which may be mentioned that she is the first oil tank steamer to be fitted with twin-screws. She will, moreover, carry more oil—about 10,000 tons—than any other ship afloat, and is the largest steamer yet built for this company, which, by the way, is associated with Mr. Rockefeller's enterprises. Another interesting provision is a powerful searchlight—one of the most powerful in the world—the object of which is to pick up her consort the barge Navahoe, at any time during the night watches should the pair become separated. The gross tonnage of the Iroquois is over 9,200 tons, the length, 476 ft.; the breadth, 60 ft.; the depth, 35 ft. 5½ in. and she has been constructed of steel throughout to Lloyd's special survey. The oil will be contained in 18 compartments, and an exceptionally complete oil pumping system for loading and discharging has been provided, together with all the necessary appliances for use in a vessel of this class. The machinery, which has also been constructed by her builders and specially arranged for the consumption of oil fuel, consists of two sets of quadruple-expansion engines, with four steel boilers.

The Navahoe has also been specially designed and constructed for the carriage of about 10,000 tons of oil in bulk and is the largest ocean-going oil barge afloat. The gross tonnage is about 8,000 tons; length, 450 ft.; breadth, 58 ft.; depth, 33 ft., and she has been constructed of steel throughout to the Bureau Veritas highest class. The barge has a striking appearance, her profile showing a forecastle poop and six masts, of which the foremast acts as a funnel, a large single-ended boiler (arranged for burning oil fuel) being at the fore end of the vessel for supplying steam to the winches and other auxiliary machinery. The sails are hoisted into position by the winches placed over each mast. The vessel is also fitted with the Marconi system of wireless telegraphy, which will eanble those on board to keep in communication with other vessels and the shore at any time. The oil will be carried in 18 compartments like the Iroquois with a similar equipment for loading and discharging. The special towing machine with large patent towing chock for connecting the barge with the vessel towing her across the ocean is placed in the forecastle. A very complete system of electric light has been installed on both vessels.



OIL CARRYING BARGE NAVAHOE.

The Navahoe is the counterpart of the Iroquois, the combination of the two vessels enabling 20,000 tons of oil to be transported from port to port at one time as if practically in one bottom.

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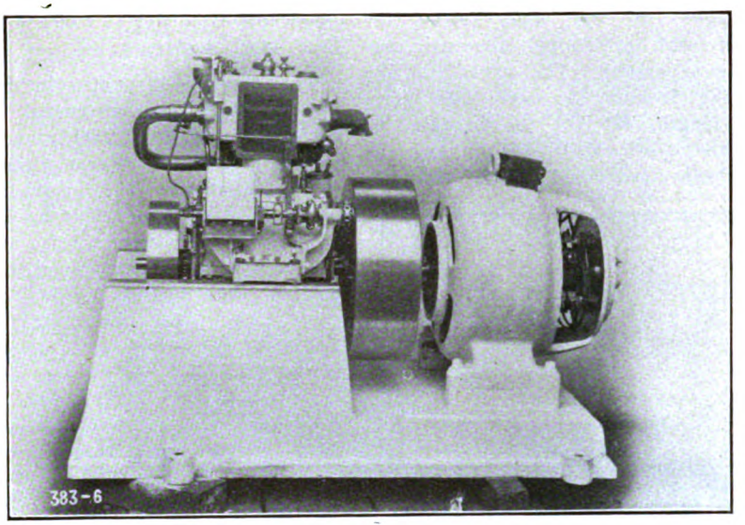


6 B. H. P. ELECTRIC LIGHTING SET.

COMMERCIAL MOTOR VEHICLE AND MOTOR BOAT EXHIBITION.

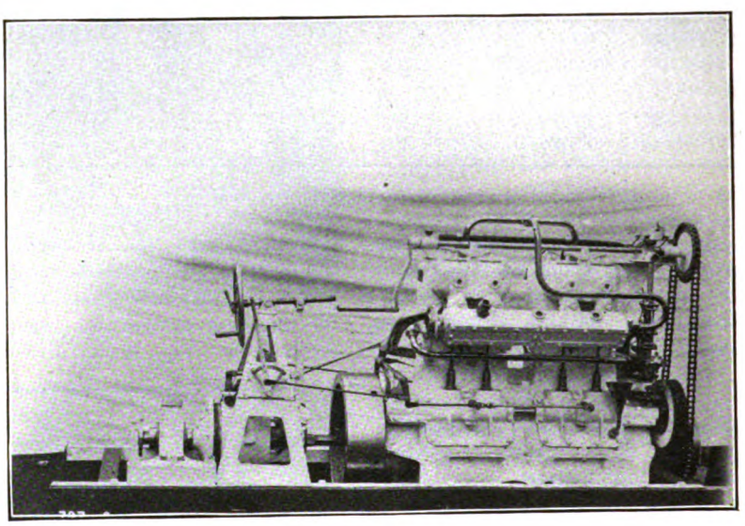
Although the exhibits in the motor boat section of John I. Thornycroft & Co., Ltd., of Chiswick, at the Olympia Exhibit, London, show no very marked departure from the types they were exhibiting last year, there is evidence that numerous improvements in detail have been embodied in the design, which will tend to increase the favor in which these engines and boats are already regarded by marine motorists.

A feature which has been thoroughly tested and perfected is the vaporizing arrangement by which either paraffine, petrol, benzine, or certain other fuels may be used. This is effected by means of a special type of change-over valve. When running on petrol the carburetor, or vaporizer, is in connection with the inlet pipe, and when using paraffine the exhaust is diverted so as to pass through a jacket round the vaporizer. When it is desired to change from petrol to paraffine, it can be done instantly by turning the change-over valve.

With this arangement it is still possible to work entirely on paraffine, by removing the bottom cover of the vaporizer and heating the inside in the usual manner.

The motors shown have their cylinders and water jackets cast together in iron, in the case of the B-types (4¼ in. x 5 in.) singly, and of the C- (6 in. x 8 in.) and D- (8 in. x 8 in.) types, in pairs. The water jacketing extends about half way down from the firing ends and is so designed that possibility of "pockets" existing is precluded, while provision is made for a natural run for the cooling water, which is circulated by a positive gear or centrifugal pump gear driven.

The valves are mechanically operated. The pistons are of cast iron, and are fitted with several rings, to obviate leakage.



52 B. H. P. MOTOR.

The connecting rods are of forged steel of double T section, with gudgeon and big ends phosphor-bronze bushed, the big ends being adjustable.

The cylinders are bolted in a vertical position directly to bed plates which are of cast iron, and form a completely enclosed oil bath crank chamber, which is rendered specially accessible for inspection and adjustment by the provision of suitable doors and covers.

The crankshafts are arranged in the bed plate and are lubricated by the same arrangement as the other moving parts.

The valve stem guides are extra long, thus ensuring steady support and no loss of oil. Between the cams and the end of the valve tappet rods are inserted hard steel rollers, to diminish friction and wear.

The gear wheels for half-speed shaft, pumps, etc., are completely enclosed, and are lubricated from the crank chamber, except in the C-type (6 in. by 8 in.) en-

MOTOR YACHT VERADAISE.

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gines, where the cam shaft wheels are of fiber.

Ignition is by tow tension in every case, though provision is made for H. T. by coil and battery.

Perfect interchangeability is ensured with all parts of the engines, by their having been made strictly to gage.

The following are the motors exhibited:

1. A 6½ B. H. P. motor of marine type, but direct-coupled to a General Electric Co.'s dynamo. The motor is 4½ in. x 5 in., single-cylinder, running normally at 1,000 revolutions. It is shown with the special "change-over" valve for paraffine or petrol fuel. For the purpose of such work as electric lighting it is fitted with a larger fly wheel than is necessary for marine work, as well as a governing device which is efficient within 5 per cent. The whole equipment is arranged on a single bed plate, and its capacity is 3½ K. W. at a voltage of 220. The dynamo is compound-wound and this has been found to give remarkably good results in conjunction with the governor on the engine.

The ignition is low tension by magneto with positive make and break in the cylinders. There is provision for H. T. if desired.

2. A 13 B. H. P. motor of marine type direct-coupled to a Worthington 8-in. low-lift centrifugal pump, capable of dealing with 850 gals. against 30 ft. with 75 per cent efficiency.

The dimensions of the motor are 4¼ in. x 5 in. It has two cylinders, cast separately. The ignition is the same type as the 6½ B. H. P. type. Normal revolutions 1,000. Power on paraffine 11 B. H. P. Fitted with "change-over" device for paraffine or petrol. Weight of motor and equipment, but exclusive of pump, 6 cwts.

3. A 53 B. H. P. (6 in. x 8 in., four-cylinder) motor, with reversing gear arranged to use paraffine or petrol. The reversing gear is of the "Thornycroft" type with drive ahead through cone friction clutch. Power of motor on paraffine, 47 B. H. P., and on petrol 53 B. H. P. Normal revolutions 750 B. H. P. Weight of motor and equipment 25 cwts. Ignition is by low tension magneto, though provision is made for H. T. if desired. Lubrication is by "splash" method. The engine has three crankshaft bearings. Half compression gear is fitted to facilitate starting. Cylinders are cast in pairs.

4. A 105 B. H. P. 8-in. x 8-in., four-cylinder motor using fuel up to 150 degrees flash point, and reversing gear, "Thornycroft" type. Power on petrol 105, power on paraffine 85 B. H. P. Ignition by L. T. magneto, though H. T. may be fitted if desired in addition. Lubrication forced to all bearings by pumps. Cylinders are cast in pairs with large openings for inspection and cleaning.

5. A 25-ft., mahogany, carvel-built motor launch for sea or river. This boat is of 5-ft. 6-in. beam by 1-ft. 5-in. draught, and is fitted with a two-cylinder 13 B. H. P. motor, reversing gear and solid propeller. Though containing every up-to-date feature the boat is generally of the same design as the Thornycroft launch Veradaise II (now renamed Balmacara) which was adjudged the best boat in any class in the 1906 reliability trials, winning the "Autocar" cup and the gold medal. The speed is nine miles per hour, and the seating capacity is sufficient for 12 persons. Being decked for and aft renders it a particularly dry boat and its shape enables it to be beached without risk of damage.

The motor is to use paraffine or petrol by means of the Thornycroft change-over valve already described.

It will be fitted with two hoods, wheel and tiller, flag staves, etc., and provision will be made for slinging in davits.

The popularity of this type of Thornycroft launch is evinced by the fact that large numbers have been supplied for pleasure and official purposes in various parts of the world, recent orders including eight for customs purposes at Tientsin and others for the Egyptian irrigation service, etc.

6. Model of one of two motor launches supplied to H. M., the King of Spain, to act as tenders to the steam yacht Giralda. These boats are 28 ft. x 7 ft. and are carvel-built of mahogany. The propelling equipment consists of two Thornycroft marine motors, each of four cylinders, developing together 60 B. H. P. With these a speed of 15 miles an hour is attained. The cabin is sumptuously decorated by maples and is so arranged that it may be lifted off without trouble if desired.

MARINE ENGINEERING AT SIBLEY COLLEGE.

Sibley College, Cornell University, has sent out the following concerning its course in naval architecture and marine engineering:

"The work of this department has been more than usually successful during the past year, having been conducted in the three natural subdivisions of the subject—technical, constructional, and financial. The number graduated was in excess of that of any previous year, and included three post-graduates. In experimental work the co-operation of the department of mechanical engineering and that of experimental hydraulics conducted by the College of Civil Engineering has produced eminently satisfactory results. The electives offered to students in mechanical and electrical engineering, in the resistance and propulsion of ships, experimental tank work, etc., have been taken advantage of by a number of competent men.

"The steam turbine course this year has been taken by 244 seniors and graduate students in Sibley College. Some of these men have gone on with steam turbine design in the second term, with the object of preparing themselves for work along that line after graduation.

"The marine engineering work proper has been taken by a class of 13 senior students and one graduate student. In view of the excellent training in machine design which the men receive during the first three years of the regular course, it is now possible to eliminate some of the designing work formerly required of marine engineering students, and to substitute computation periods for it. The marine engineering work is given in the senior year only, but those intending to take it are advised to take a preliminary course in naval architecture, of two hours per week, second term junior year."

GOLDSCHMIDT THERMIT CO.

The Goldschmidt Thermit Co. announces the establishment of an office and works at 103 Richmond street, west, Toronto, Canada. The new branch was opened for business May 1, and is under the management of Mr. E. C. Rutherford, of Toronto. Mr. Rutherford is a Canadian by birth, and has a wide acquaintance among the business men of the dominion, having been for several years the manager of the Magann Air Brake Co., and the Canadian Brake & Supply Co. A complete stock of Thermit and appliances will at all times be carried at Toronto, and the branch organization will be in a position to execute promptly the welding of heavy steel sections, such as stern posts of steamships, crank shafts, etc., as well as trolley rails in paved streets, motor cases and other broken steel sections. A fully equipped repair shop will be in operation for the repair of steel castings up to 1,000 lbs. in weigh.

The Upson Nut Co. has given contract to the Great Lakes Dredge & Dock Co. for the construction of a new 1,000-ft. reinforced concrete dock along the river front of the plant of the Central Blast Furnace.

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PACIFIC LUMBER AND FREIGHT HOIST.

Every ship owner or operator interested in the prompt and easy handling of cargo, is in favor of the simple, strong and efficient steam winches here shown, if he is acquainted with them. Those illustrated (from photograph) are one pair of the set on steamer Vadso, of Victoria, B. C., owned and operated by the Boscowitz Steamship Co., who in recent letter say:

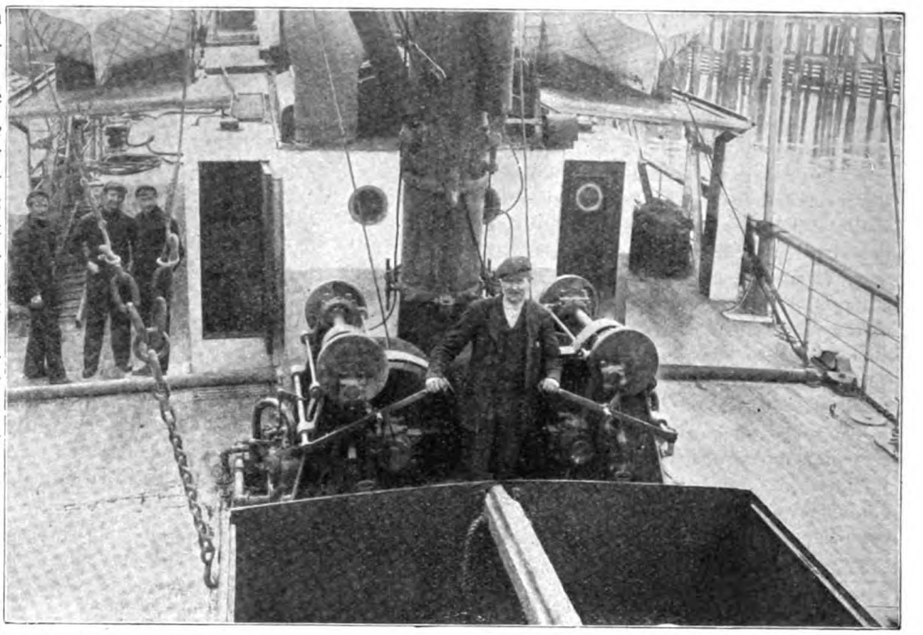
"We are pleased to add that the winches are giving good satisfaction and doing good work. They have the weight in the right place, and liberal bearing surfaces. They are now handling general cargo and their chief value is that one man can handle two of these winches, thus taking the place of two men that were necessary with the old style of winch. Your reversing valve is a great feature, and the winches run very quietly for a geared machine."

These hoists or steam winches are built exceptionally strong for hard usage, always ready for work, easily operated, and being under perfect control by lever to the steam reverse cylinder are not complicated by the addition of a brake. They are made in several sizes, the majority having double 7 x 8 engines, of the double acting type, and all cylinders fitted with balanced piston valves having removable bushings. The steam reverse cylinders having same type of valve. Connecting pipes between cylinders are heavy gage copper with substantial brass flanges, forged connections, steel and semi-steel "herringbone" gears and protected with a stout shield. Drum shaft ground to 4 in. and engine shaft to 3 in. diameter. A good job all the way through—second to none.

These special hoists are made (on orders only) by Marine Iron Works, Station A, Chicago, Ill., usually in pairs—right and left—and at very reasonable prices, delivery to the seaboard being moderate in cost and promptly executed.

Hoists fitted with the double 8 x 8 (or 7 x 8) engines, occupy a deck space 38 in. by 75 in., each. Extreme width over warping drum, 7 ft. 3 in. Extreme height, 4½ ft. Weight (each), 5,400 lbs. Easy quick lift, one ton each, capable of lifting two tons. Although the Pacific is the home of these hoists, it is so only by chance, for wherever they are installed, it means an "entering wedge" for more of them in the same district.

The same company (Marine Iron Works, Chicago) build a smaller steam hoist of similar design, especially for small and medium size commercial boats, suitable for warping, raising anchor, hoisting cargo and other miscellaneous duty which such vessels are so often called on to do. Steel is used in their construction to a greater extent than usual on such work, in order to insure strength and wearing qualities within reasonable weight and space limitations.



PHOTOGRAPH OF WINCH ON STEAMER VADSO, MANUFACTURED BY MARINE IRON WORKS, CHICAGO.

NEW WEST INDIAN FRUIT CARRIER.

Messrs. Workman, Clark & Co. of Belfast have just completed a special type of fruit carrying steamer, named Marowijne, for the Royal West Indian Mail Co. of Amsterdam. This vessel is 352 ft. in length, with a gross tonnage of over 3,500, built under Lloyd's special survey for the highest class in their registry of shipping, being of the spar deck type, with a long bridge and top gallant forecastle and three complete steel decks. The cargo space is divided by the decks and bulkheads into 14 compartments, of which 8 have been specially insulated and prepared for the carriage of fruit cargo in bulk. This cargo will be kept in good condition during the voyage by a continual supply of fresh air, cooled by passing through cooler rooms, and delivered by fans through ducts to each compartment. These cooler rooms are fitted up on the principles adopted by the United Fruit Co., Boston, who has made a specialty of fruit cargo preservation, the vessel being chartered for their service between Dutch Guiana and New York. The fruit holds are also provided with an arrangement of heating, so that the air can be heated, should it be found necessary during the voyage or whilst discharging. Four large hatchways gives access to the holds, and each hatch is efficiently equipped with the steam winches and special appliances necessary for the careful and expeditious loading and discharging of large cargoes. The propelling machinery has been constructed by the builders, and consists of a set of direct-acting triple expansion engines of the latest type complete with all the necessary auxiliaries.

The Erie Pump & Engine Co., manufacturers of centrifugal pumps, steam, gas and gasoline engines at Erie, Pa., have just issued their new catalog F. This catalog covers a complete line of centrifugal pumps, gas, gasoline and steam engines and presents several new features in connection with centrifugal pumping propositions. An especially interesting outfit is that of a four stage turbine pump, direct-connected to a gasoline engine which is particularly desirable for isolated plants and is becoming quite popular.

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The Upson-Walton Co.

CLEVELAND, OHIO

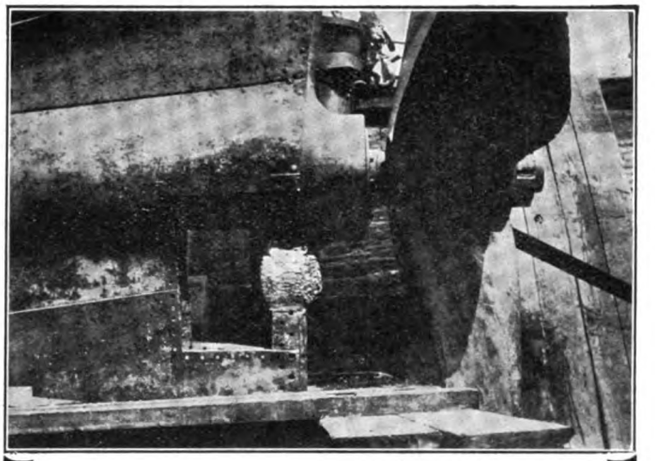
AMONG the first vessels that we fitted out was the Nellie Redington. That was nearly forty years ago, but the Nellie Redington is still afloat.

Among the latest vessels that we have fitted out is the Henry Phipps.

The Redington carries 1,500 tons; the Phipps, 12,000 tons.

As 1,500 is to 12,000 so is The Upson Walton Co. of thirty-six years ago to the Upson Walton Co. of today.

Our reputation as Outfitters of Vessels has grown year by year.



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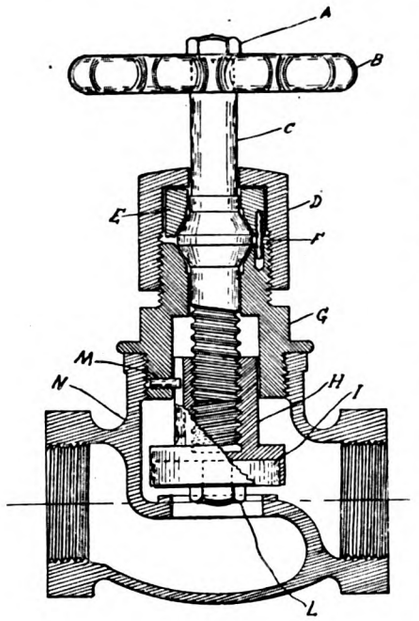
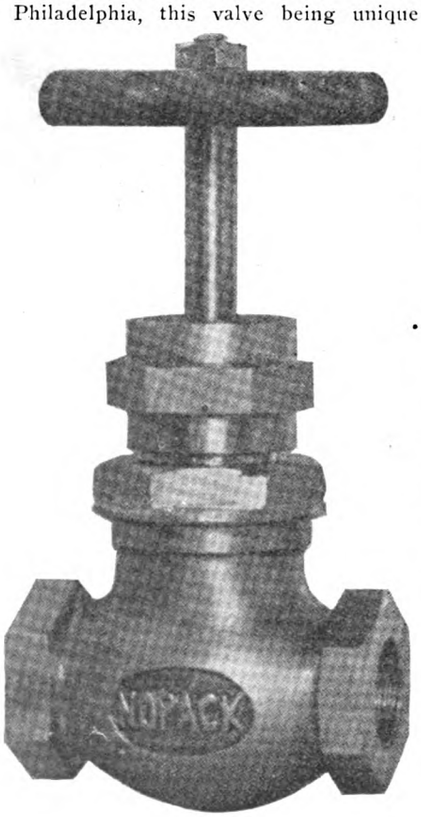
A PACKINGLESS VALVE.

The accompanying illustrations show a new and distinct type of globe



valve for steam or water service, made by the Nopack Valve Co., of Philadelphia, this valve being unique



in that, as its name implies, it is entirely devoid of packing.

The stem, as will be seen on referring to the sectional view, has no vertical movement, a perfect ground joint being formed between the bonnet and lock-nut assuring the prevention of leakage. Another feature of this valve is the vertical movement of the valve—or disc-holder, the valve being raised or lowered on the threaded spindle by turning the wheel. Being keyed in position the valve has no rotary motion, and therefore cannot be cut. These valves, or discs, are not of special design, and are interchangeable with any first-class discs obtainable at supply houses. Nopack valves are made of high-grade steam metal and are guaranteed for a working pressure of 150 pounds.

The valve is the invention of a master plumber and has been tried out under actual service conditions. Engineers and others responsible for the handling and upkeep of machinery will appreciate the advantage of a valve that cannot leak, and, therefore, will not call for repacking, that will wear well and remain perfectly steam or water tight, as is claimed for the Nopack valve.

THE JONES STOKER IN MARINE SERVICE.

The fact that her boilers have been equipped with Jones stokers during the winter lay up, will make the James E. Davidson an object of special interest to marine men during the season about to open. The manager of the line to which the Davidson belongs is not accustomed to entertaining a proposition which will not bear the closest investigation, and in ordering Jones equipment for the Davidson it would seem that he has purchased apparatus capable of producing a remarkable saving in coal and otherwise, judging from the substantial financial returns experienced by the owners of the Eugene Zimmerman, as stated in a bulletin issued by the Under-Feed Stoker Co. of America.

Being comparatively new in marine service, although old as applied to stationary plants, this system of boiler firing cannot fail to interest vessel owners because of the economical possibilities it already has demonstrated in actual operation in the fire-hold of a steamer. In whatever case this interest may be shown by owner or manager to the extent of requesting submission of a figure for the installation of the equipment, the manufacturers say that they will be glad to make an examination of the boilers and give the matter careful attention.

Although it is out of the question to undertake the installation of the equipment at this time, owing to the near approach of the opening of navigation, the suggestion is made by the manufacturers of this apparatus that all details concerned in a proposed installation can be taken up during the coming summer, and if it is concluded to install the equipment when the boat lays up in the fall, plenty of time then can be had for completing the installation before the vessel is called into service for the season of 1909.

ROBERTS WATER TUBE BOILERS.

The Roberts Safety Water Tube Boiler Co. has been extremely busy for the last month or six weeks necessitating considerable over time being made at their works in order to keep anywhere near their specified time of deliveries.

They have recently shipped 20 odd boilers of standard sizes; five to New York City, one to Boston, four to Portland, Maine, three to Staten Island, one to Brooklyn, New York, one to Missouri, two to Norfolk, Va., two to San Francisco, Cal., one to New Jersey and one to New York state, most of which, we understand, are orders from old customers who have used Roberts boilers in other boats which they now, or have previously owned, and have, in consequence of the satisfaction which they formerly received, placed orders with the Roberts Safety Water Tube Boiler Co., in the present instance without competition, as they did not even care to entertain prices on other makes of boilers. "The proof of the pudding is in the eating," and the above also proves that "A pleased customer is the best advertisement."

Roberts boilers are the pioneer of all marine water tube boilers, having been on the market for 30 years, and the first one that was ever built is still giving good service and has been every year since it was built.

There are a great many hundred Roberts boilers in use, and yet still there is less trouble reported from all these Roberts boilers than there is from other makes of more recent invention and with less boilers in use, and, consequently, less opportunity for trouble.

The greatest point in favor of Roberts water tube boilers is the fact that they never need cleaning internally, and yet still remain clean internally indefinitely, which eliminates considerable trouble and expense. They are also the most reasonable in first cost and least extravagant to maintain. Their long, enviable career has been "One blaze of glory."

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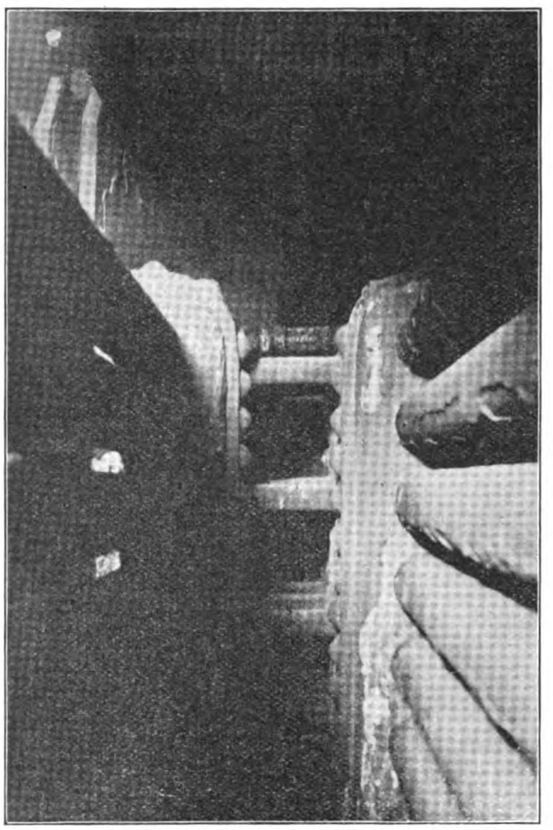

Scale leaving the sheets of an old boiler after 3 months service of Rogers Purifiers

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Combination Steam Boiler Heater, Purifier, Oil Separator and Circulating Device

permits the operation of Marine Boilers from four to six months without cleaning. It is the cheapest and easiest to operate—absolutely safe and purely mechanical. Every one installed is a complete success.

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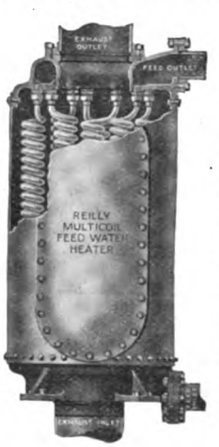

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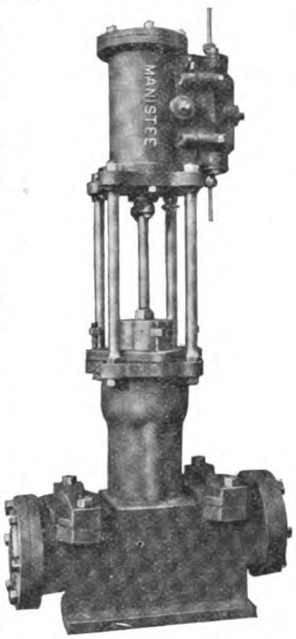

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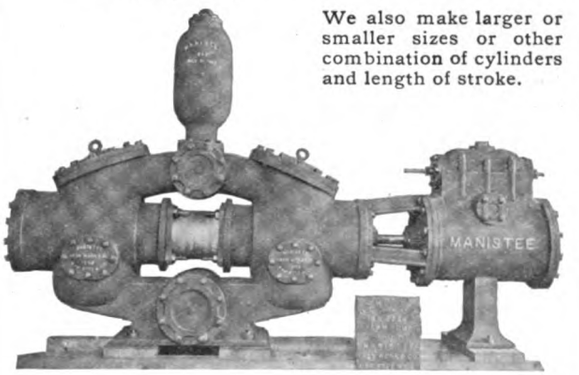
8″ x 5 ″ x 10″
10″ x 6 ″ x 12″
12″ x 7¼″ x 12″
14″ x 8″ x 12″
16″ x 10″ x 18″
18″ x 12″ x 24″
20″ x 14″ x 24″
24″ x 16″ x 24″
30″ x 18″ x 24″

We also make larger or smaller sizes or other combination of cylinders and length of stroke.



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